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ABSTRACT

This manual illustrates an interdisciplinary team approach to teaching four academic subjects for seventh grade students. Eight interdisciplinary units are presented that were developed by teachers around two or more of the following subject areas: language arts, social studies, science, and mathematics. An introduction to the Block Plan, as it was implemented by the Edmonton Public School Board (Alberta, Canada), describes it as a cooperative effort between two teachers who have the option of flexible scheduling for four 40-minute class periods per day. Instruction time for each unit is a maximum of four weeks. Each unit includes a teacher's manual and a student handbook. The teacher's manual covers the rationale and philosophy behind the unit and discusses the unit exercises, while the student handbook consists of materials that can be duplicated for student use and reference. The eight units and their subject areas are: (1) The Beaver (science and language arts); (2) Dairy Farming (science, mathematics, and language arts); (3) Disasters (social studies, science, and language arts); (4) Multiculturalism (social studies and language arts); (5) Plants--Rate, Ratio, and Percentage (science and mathematics); (6) Library Research Reporting Skills (language arts, social studies, and science); (7) Wheat Farming in Western Canada (social studies, language arts, and science); and (8) Who Am I (social studies and language arts). (FG)

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THE BLOCK PLAN

GRADE SEVEN

INSTRUCTIONAL MANUAL

Edited by

SOL E. SIGURDSON

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BLOCK PLAN

GRADE SEVEN INSTRUCTIONAL MANUAL

- Edited by
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BLOCK PLAN

GRADE SEVEN INSTRUCTIONAL MANUAL

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BLOCK PLAN

GRADE SEVEN INSTRUCTIONAL MANUAL

The manual illustrates an approach to teaching the four main academic subjects in grade seven: language arts, social studies, science and mathematics. It grew out of a particular instructional pattern in which a pair of teachers were responsible for teaching the four subjects to approximately 55 grade seven students. This particular approach, called the "Block Plan", was implemented by the Edmonton Public School Board under a special project sponsored by the Research and Planning Branch of Alberta Education. The present manual contains documentation of specific units developed by the teachers and a list of activities that grew out of the Block Plan instructional pattern.

The Block Plan - A Cooperative Approach

As the name suggests, the pair of teachers assigned to two heterogeneously grouped classrooms were encouraged to cooperate in the instruction of the four main academic subjects, each teaching two of them. To further this cooperation, teachers were given four periods a day to schedule as they saw fit, for the four subject areas. Having access to these four periods meant that, although the teachers normally taught the subjects in regularly scheduled 40-minute periods, they had the option of using the time flexibly. This flexibility of the timetable made it easier for them to break out of the usual 40-minute lesson framework. Other features of the Block Plan included

1. all students were assigned heterogeneously to classes of approximately 27 students.
2. each pair of teachers were assigned to two classes
3. one of the pair had one of the rooms for their homeroom
4. the four periods allotted to the four main academic subjects for the most part occurred in a block of time often from 9 a.m. to 12 noon
5. the weakest students in language arts and mathematics were given special help in the form of a "differentiated support option".

This particular instructional pattern made possible several types of instructional activities not usually found in junior high schools. In order that the reader gets a fuller understanding of the Block Plan we will report on these activities.

The Block Plan - Instructional Activities

During the course of implementing the Block Plan in grade seven, the teachers were encouraged to explore ways of using the special features of the plan. The types of instructional (and curricular) activities engaged in are reported here under the following headings.

I developing inderdisciplinary units
II employing flexible scheduling
III interrelating subject areas
IV assuming a prominent counselling role
V planning with their Block pair

VI engaging in large group teaching
VII other possibilities.

I Developing Intedisciplinary Units

The advocacy of developing interdisciplinary units, even within the Province of Alberta, goes back 50 years. Current developments in the United States also lend support to this approach to junior high school teaching. There are still few formats for interdisciplinary teaching available for teachers to follow and even fewer formats that have been carefully tested. For this reason, the teachers were encouraged to use their own ideas and experience as the basis for developing units.

The rationale for the desirability of interdisciplinary units rests on four basic arguments.

1. Early adolescence brings an awareness of providing for oneself in a practical manner. School subjects can be made more meaningful to students if they are shown to have contact outside their own sphere. One simple way of achieving this is to show how one subject area can support another one. Related to this argument is that field trips, engaged in to show the school subject's relevance to the outside world, are often best approached in a multi-disciplinary manner. A science field trip to a pond contains a wealth of experience for literary activities, mathematical measurement, scientific concepts and perhaps even some geographical concepts for use in social studies. Interdisciplinary units can bring out the usefulness of some subject areas to other subject areas and to the outside world.

2. Apart from the usefulness, teachers often find themselves and their classes involved in highly-motivational units in one subject area. It is appropriate to capitalize on the student interest by dealing with the same material in another subject area. Students engaged in a social studies unit on multiculturalism can write short stories, descriptive paragraphs on their family background which serve the language arts curriculum.

3. Efficiency of instruction can be achieved if a student can be working on two or more subject area objectives simultaneously. Our interdisciplinary units give instances of the same piece of work even being marked from the perspective of different subject areas. Scientific work requiring mathematical concepts can mean that, quite apart from showing the applicability of mathematics, student effort is being used simultaneously to develop knowledge and skills in both areas.

4. Finally an interdisciplinary approach may be useful in tackling certain student-generated concerns or general areas of concern initiated by the teacher. The problem of becoming acquainted with one another at the beginning of the year can be helped by an interdisciplinary unit on "Who am I". Depending on how teacher-oriented the unit is the students can actually take charge of their own learning, employing subject area knowledge as necessary.

Although much has been written on core curriculum, fusion, integrated subject areas, and team teaching most of the theory pales when confronted with a particular school situation. For this reason, the teachers in the project were given a general overview of interdisciplinary teaching and were encouraged to put their own ideas into practice as they applied to the classes they taught.

The purpose of this project was not to generate theory on interdisciplinary teaching but to develop practical units. However it will be interesting to reflect briefly on what units were produced and what purposes motivated them. For this purpose we will divide them into four groups.

Group 1 Two units seem to have been notivated by student needs. "Who Am I" was a need felt by students, at the beginning of the year, to know each other. The unit consisted of a number of activities designed to make each student better known to his classmates.

Another unit, Library Research Reporting Skills, arose from a teacher-identified need for students to improve in an area which would help them in all of their studies. While the unit is certainly more than a "How to Study" help, it develops along the "How to Study" lines.

Both of these units aligned themselves with social studies and language arts. The second one of the two is more academically oriented than the first.

Group 2 A group of two units seems to have been motivated by occupational (practical) concerns: wheat farming and dairy farming. Each centred around one subject area, social studies and science respectively. Each drew on language arts and mathematics as they were needed to investigate diverse dimensions of the problems. In both of these units the emphasis was on the topic at hand, not subject areas, both used field trips as a focal point, both used guest speakers, and both culminated in giving the student a good look at the particular occupations rather than at social or scientific concepts.

Group 3 Two units fall into the category of centering around one subject area while drawing on others. "The Beaver" and "Plants" are clearly focussed on science topics while having parallel topics in language arts and mathematics respectively accompanying them. This format of concurrent paralleling units is well established in the literature and seems to have been a comfortable mode in which these teachers could work. Both units,"The Beaver" & "Plants" contained a wide variety of activities with the former including a field trip to a beaver dam and the latter a trip to Pine Ridge Tree Farm.

Group 4 The last group is characterized by the particular media through which major activities in the unit were presented. "Multiculturalism" was based on a film series "Newcomers". The unit while seeming to center on a social studies concept uses many language arts experiences (viewing the films as communication or art is itself a language arts experience) and even art. The focus contribution of the unit appears to be in the affective domain. In trying to sum up the orientation of this unit we could say it uses an audio visual-esthetic experience, to deal with a concern of many of the students in the school, their ethnic roots, and draws equally on social studies and language arts concepts and knowledge. The teacher himself sees it more clearly in a social studies dimension but an analysis does not seem to bear this out.

The second unit in this group, "Disaster", used the media of the newspaper as the focus. Although primarily centred in social studies, only a few actual social studies concepts are developed and used. As in "Multiculturalism" one of the main learnings is in the affective

area: developing the desire to come to the aid of disaster victims. The unit "Disasters", uses skills and concepts from social studies, language arts and science. The culminating visit to the newspaper plant suggests a re-focus on media. The unit along with "Multiculturalism" seems to go well beyond subject area boundaries.

In concluding this assessment of the units which are reported in "Interdisciplinary Units" we should stress that they have all been tried in the classroom with at least two groups of students. They carry the individual stamp of the particular teacher. While "better" units from a theoretical curriculum standpoint probably could have been produced by a more centralized approach, we feel that the units as they exist are more authentic, more easily used and cover a range of approaches and styles that will strike a responsive chord with a wider range of teachers. The reader will note the overwhelmingly positive evaluations written by the teacher at the end of each unit report. While we feel some need to apologize for this, this could well be expected from teachers who have created, implemented and revised all their own units. We hope the units will be implemented and further revised by other interested teachers.

II Employing Flexible Scheduling

In addition to developing the interdisciplinary units, teachers in their Block Plan were able to use the flexible timetable creatively. Three considerations need to be made regarding the flexibility of the block time: flexibility means possible longer periods (double, triple, whole morning), possibly rearranging the order of periods, and possible efficiency in scheduling activities for 2 classes at a time. Keeping these considerations in mind the teachers reported the following activities being used during the school year.

1. Resource people brought in for a minimum of 55 students' contact (either in one large group session or in sequential sessions). Resource people are easier to book, because more times are available for them and also they are easier to schedule.
    a. cattle and dairy farmers
    b. agriculture representative
    c. policemen
    d. health professionals

2. Classroom activities easily extended when convenient.
    a. full-length feature film
    b. finishing a test
    c. science experiments
    d. debates
    e. classroom clean up
    f. collecting and distributing classroom materials

3. Field trips easily scheduled.
    a. Swiss Valley - fall, winter, spring
    b. Edmonton Journal newspaper plant
    c. local parks
    d. library (public)
    e. tree farm

In addition to ease of scheduling, two classes usually made the trip and usually made observations relevant to two subject areas.

4. At the beginning of the year classes kept together for longer periods for necessary organizational concerns.

    a. preparing for fall field day
    b. administrative details

5. Concentrated units on specific topics taught where material availability may be limited:

    a. newspapers
    b. atlas
    c. resource texts
    d. dictionaries

III Interrelating Subject Areas

6. In addition to developing interdisciplinary units teachers engaged in other interdisciplinary activities of a minor nature.

    a. dictionary unit on science words
    b. numerous language arts activities in social studies and science
    c. language arts components to several field trips
    d. field trips were often of an interdisciplinary nature

IV Assuming A Prominent Counselling Role

Having double the contact with students, besides close contact with another teacher who had double contact enabled a teacher to get to know individual students better. This in turn led to more effective helping of students over difficult times and tasks.

7. Teachers report some "team" counselling by a team of two teachers. They often report sharing perceptions of student difficulties and achievements. They also report easy access to students for purposes of counselling. Teachers most often mentioned early and rapid detection of student difficulties was possible with the help of their teaching pair.

8. Although some counselling-related activities, such as autobiography writing, were engaged in they were not used very often or consistently in the classroom. Counselling-related activities took the form of a get-acquainted sessions at the beginning of the year.

    a. rollerskating
    b. pancake breakfast in home economics room before a field trip
    c. any field trip has the dimension of getting-to-know-each-other

V Planning With Their Teaching Pair

Planning activities (of a curriculum nature) were limited to major activities such as field trips. Absent from teacher reports were accounts of day-to-day planning of classroom (curriculum) activities by the pair of block teachers. As mentioned above, they "planned" regarding individual students, mostly.

VI Engaging In Large Group Teaching

Also conspicuously absent from the activities were large group (55 students) activities. The exceptions to this were actual field trips taken in large groups (two classes), showing films, and resource people occasionally speaking to two classes at once. Large group teaching is not implied by the Block Plan.

VII Other Possibilities

Other possible activities for Block Plan teachers which were discussed but not implemented.

1. Blocked classes (7-1 & 7-2, say) should be introduced to each other in some way.
2. Develop a scheme of better students helping less capable - buddy system.
3. More use of full morning in-school activities.

Interdisciplinary Units

The teachers endeavoured to develop eight interdisciplinary units which include at least two subject areas. Most students in grade seven were exposed to two of these units. We do not want to give the impression that the whole school year consisted of teaching these units. At most each unit took three to four weeks. Each of eight individual teachers took the responsibility for developing one unit. The eight units presented here represent a variety of teaching styles and approaches. The reader can rest assured that the unit he is reading about was tried by a classroom teacher without any special physical resources. We have tried to present the units in a common format (which does not suit all units equally well but which does make it easier for the reader).

The units are presented in two parts 1) Teacher's Manual, including rationale, philosophy, and discussion of approaches and 2) Student Handbooks, consisting of materials which are meant for student use. In the Teacher's Manual, the headings we have used are:

Title - briefly descriptive.

Major Themes - outlining the main sections of the unit.

Time - stating number of 40-minute periods devoted to various themes.

Subject Areas - defining which curriculum areas are covered in the unit, trying where possible to refer specifically to the Alberta Education Curriculum Guides.

Rationale - stating why a grade seven teacher would find this unit especially attractive for her class.

Intents - giving broad and specific goals of the unit, sometimes again referring to the Alberta Education Curriculum Guides.

Activities - giving ideas behind all the unit activities, reasons for the suggested sequence of activities, possible variations, and so on.

Resources - listing all materials used.

Evaluation - consisting of the teacher's own evaluation of the unit as he sees it in retrospect and the teacher's evaluation of students after the unit.

The Student Handbook follows no common pattern for each unit but consists of pages which could be duplicated for student use and reference. In general we have not treated the Student Handbooks as workbooks although most of the unit developers preferred they be treated so. Teachers using these units will have to revise the Handbooks if they want to use them in ways that are not provided for herein.

TEACHER'S MANUAL

FOR

Mervin Tuplin	:	THE BEAVER (science and language arts)
Gerald Bonnema	:	DAIRY FARMING (science, mathematics and language arts)
George W. Smith	:	DISASTERS (social studies, science and language arts)
Garry Douglas	:	MULTICULTURALISM (social studies and language arts)
Gary Lilley	:	PLANTS-RATE, RATIO and PERCENTAGE (science and mathematics)
Ed. E. Simbalist	:	LIBRARY RESEARCH REPORTING SKILLS (language arts, social studies and science)
Marilyn Webber	:	WHEAT FARMING IN WESTERN CANADA (social studies, language arts and science)
Cam Eddy	:	WHO AM I (social studies and language arts)

THE BEAVER Mervin Tuplin

MAJOR THEMES

The major themes covered in this unit are as follows: the beaver as a forest animal representing the science component; literary works on the beaver representing the literature component; interesting facts on the beaver representing the English component; and words associated with the beaver representing the spelling component.

TIME

A minimum of 22 periods is required to complete this unit. The division of time among the four themes was allocated as follows:

The beaver as a forest animal	- 12 periods with one afternoon session devoted to an actual field study of a beaver habitat
Literary works on the beaver	- 4 periods
Interesting facts on the beaver	- 4 periods
Words associated with the beaver	- 2 periods

SUBJECT AREAS

The major theme in this unit is the beaver as a forest animal. As a part of the science curriculum, the major emphasis in science will be on appreciation of how the environment of an area results from the interaction of the biotic and abiotic factors. In this section of the unit students will learn that communities have certain characteristics which may be used to distinguish them from one another.

In this study, students will gather background information about the beaver as a pre-lab activity and visit a beaver habitat as a lab activity.

The secondary theme in this unit is the literary works on the beaver. The Language Arts curriculum allows for an emphasis on reading stories and poems for appreciation. Students will learn that the beaver has an "almost human mentality." They will understand that human habits such as sleeping, working, housekeeping, wrestling, dancing and even complaining are also demonstrated in the lives of beavers. Students will conclude that animals such as the beaver will fit the stereotype of the "fighting Irishman" and that they have the "mind of a man and the ways of a child".

Also within the Language Arts scope the theme of interesting facts on the beaver can be dealt with in the English section. Students will be learning kinds of sentences and writing descriptive paragraphs through the use of facts about the beaver.

The spelling facet of the Language Arts program is also covered in this unit. Students will learn sentence structure, increase their vocabulary, improve dictionary skills, and learn to write the words correctly that have been used throughout the unit.

RATIONALE

> "Degree of literacy certainly makes a difference in a child's ability to write easily and confidently, but it does not form his imagination. The power to see the world in a strong, fresh and beautiful way is a possession of all children."
>
> (Koch, 1971, p.46)

Learning is a process which involves many experiences that an individual has to increase his knowledge in all facets of his life. Since motivation is a key to learning, I have chosen this unit because, for grade sevens, it involves a variety of experiences at the beginning of the year which stimulate a lot of self-motivation on the part of the student. To begin a school year in September, with a unit such as this allows me to establish and reinforce at the beginning of the year several basic classroom management expectations such as organization, classroom behaviour, penmanship, homework assignments, promptness and that field trips are a learning experience. It is beneficial to establish these goals at the beginning of the year so that students know what to expect in terms of quality and standards for the year. Since the unit is short students will be evaluated early in the fall and therefore will have some idea of how they are progressing. It is convenient to be consistent with expectations because the unit covers several themes.

INTENTS

The broad goals are in keeping with the Program of Studies, Alberta Education. In science theintent is to provide an in depth study of the beaver and how this one animal can put a new meaning to the phrase "wild animal." The beaver, as are many animals, are very organized.

At the end of this unit the student should be able to:
1. appreciate th engineering skills of the beaver
2. appreciate the effect the beaver has on the environment
3. state how the beaver is structurally adapted to its environment
4. recognize beaver tree-cutting areas.

In Language Arts the intent is to allow the student to appreciate how nature has inspired many of man's literary works. The student in this unit gets an "insight into creative inspiration." It is also the intent to provide opportunities for students to experience language in functional, artistic and pleasureful situations with the aim to develop flexibility in language for a variety of purposes.

SPECIFIC OBJECTIVES

<u>Literature</u>

The student should be able to
1. appreciate the literary works of authors on nature and wild animals.
2. stir imagination, deepen understanding, arouse emotion and give pleasure through the use of written language.
3. learn interesting facts about the beaver.

English

1. communicate his thoughts using written language as well as verbally.
2. state how the beaver affects the environment in which it lives.
3. explore the environment and ideas of others.
4. evaluate by the use of language.
5. write a descriptive paragraph.

Spelling

1. see relationships between the flow of words in speech and the arrangement of words on the printed page.

ACTIVITIES

The following section discusses each of the activities in the unit. It should be noted that the activities were done in order as they appear under each subject area.

Reference is made to the objectives as outlined under the heading Intents according to the curriculum guide Alberta Education for science and language arts and to the Edmonton Public School Board Science units developed from C.R.I.B. (Curriculum Resources Information Bank).

The following activities were used in the science component of the unit:

Activity #1 "Eager Beaver Award"

The purpose of this activity is to inform students before they begin the unit that they will be marked on their attitude, interest, effort and application. There will be an "Eager Beaver Award" given to the one individual for the highest commendable performance.

Activity #2 "What am I"

The objective of this activity is to create some curiosity on the part of the student. This is a problem-solving work session in which students work on their own to determine the identity of an unknown species of animal which when identified will become the title of our unit. They are given three sets of clues. The clues include distribution data, information on feeding habits, and on predators. The students plot distribution data for their unknown animal using 15 sets of "Where I Live Information". Each data set involves a place, and in brackets, a distance and a direction.

Using distribution data plotted on their work sheets and the data on food habits and predators, they are requested to eliminate those animals in a list provided that they don't think it would be. After making a 'best guess' as to the animal they think they represent, they are allowed to consult the distribution maps, books, brochures, etc. and can either change their minds or stick with the guess and complete the work sheet.

Activity #3 Background Information

This is the main section of the unit and it should provide the student with a workable knowledge of the beaver and its habits, so that they can better understand what they will see when they visit an actual beaver dam-site. The students may use the information provided to answer these questions.

Activity #4 & 5
These activities may be done at anytime while students are working on activity #3.

The purpose of these activities is to provide students with additional background information in a variety of ways to keep up their interest.

Activity #4 Film "The Age of the Beaver."
This is a film which shows the beaver in action showing his outstanding engineering ability.

Activity #5 Beaver Kit
This is a kit designed to display the various structures built by the beaver.

Activity #6 Slide Set
This activity is designed to assist the student in becoming familiar with a particular beaver habitat site that they are going to visit.

Activity #7 Map Study of Beaver Site
The purpose of this activity is to acquaint the student, by using a map, with the location of the beaver site in relationship to the school.

Activity #8 Field Trip
The purpose of this half-day field trip is to provide the students with an opportunity to observe a beaver habitat site and to record their observations in a systematic manner.

Activity #9 Word Search
This activity is done on the bus en route to the school. It is an exercise for the students to search the names of wild animals and to neatly record them in the spaces provided. Its main purpose is to keep the students busy on the bus while travelling and therefore are made more aware that the field trip is a learning activity.

Activity #10 The Beaver and Its Environment
The purpose of this activity is to allow the students an opportunity back in the classroom to make some inferences based upon observations recorded on the field trip.

Activity #11 Test
The purpose of this activity is to test the students on the knowledge that they have learned during the time spent on the unit. It should be administered after all the activities have been completed in the other subject areas as well.

Literature Component.

Activity #1 Grey Owl
The objective of this activity is to acquaint the students with some of the background of Grey Owl who spent much of his time studying wild animals. It is important to mention that his inspiration for writing came from his love of nature.

Activity #2 The House of McGinnis

The purpose of this exercise is to have the students read the story, about beavers, silently for enjoyment.

Activity #3 The House of McGinnis

The purpose of this activity is to test the students' comprehension skills by assigning them questions about the story and also to teach skills such as skimming, making inferences and increasing vocabulary.

Activity #4 Library Books

This activity is included in the unit to provide an opportunity for enthusiastic students to read more about Grey Owl and/or to read articles written about the beaver.

English Component

Activity #1 Kinds of Sentences

The objective of this unit is to teach the students the four kinds of sentences. The examples used in teaching and the sentences that are given to identify, will all be sentences that deal with factual information about the beaver.

Activity #2 Descriptive Paragraph

The purpose of this activity is to teach the logical sequence involved in writing a paragraph. The students are required to number the sentences in a chronological order, choose a title, and write the sentences in paragraph form. This exercise gives the student the experience of writing a paragraph and at the same time is learning basic skills such as topic sentence, one theme, proper sequence, and concluding sentence.

Spelling Compononent

Activity #1 Vocabulary

This activity is designed to give the students exercises involving some basic spelling concepts and dictionary skills using words from the unit.

Activity #2 Dictation

The purpose of this exercise is to test the students' ability to write the words that they have used during the unit. The mark obtained on this test was a part of the total mark for the unit.

EVALUATION

I felt that the unit was most interesting and successful from my point of view in terms of student self-motivation and their eagerness to learn. It was short, included a variety of activities, culminated with a field-trip, all of which contributed to the success of the unit.

Perhaps, because I was enthusiastic about the unit, the students sensed this and were also very willing to do the activities and had a desire to do well.

Since the unit was short and the information learned is manageable for the students they were able to gain some self-confidence in terms of writing the test and feeling successful.

The study of this animal, Canada's national animal symbol, should also provide an opportunity to correlate science teaching with social studies (history). A joint-science - social studies unit could possibly be developed on the basis of this animal. It would be possible to add the theme "the role of beaver in Canadian history" as another dimension for this unit. Students would gain an appreciation of how wildlife is an important renewable resource and how the original inhabitants of what is now Canada depended on it for food and clothing and still do in some remote areas.

To add to the literary theme, it would be feasible to discuss the proper procedures for debating and then divide the class into debating teams to debate the question "Can trapping and conservation co-exist?"

In addition to adding the debate to the Language Arts component it would be possible to have the students write a fable to illustrate the life of the beaver. A list of proverbs could be given and students could choose one to illustrate how "human-like" the beaver is.

I would caution anyone in adding too much to the unit because it could become very long and consequently it would become difficult to maintain high interest throughout the unit.

Student evaluation was in the form of written short answer tests, interest, effort and application.

In conclusion, I would teach this unit again because the student and teacher reaction to the unit was positive.

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TEACHER RESOURCES AND ANSWER KEY

FOR

THE BEAVER

EDMONTON PUBLIC SCHOOLS

Grade Seven Life Science

FIELD STUDY PERFORMANCE

Eager Beaver Award

Presented To

_____

17

In Recognition Of

Commendable Performance (Interest, Effort, Application)

In Carrying Out the Field Studies at Whitemud Creek

During the Class Field Trip in the Fall, 1980

21

20

Teacher _____

Date _____

Lloyd G. Pearce

Science Field Studies Consultant

Activity #3 KEY - BACKGROUND INFORMATION QUESTIONS

The Beaver - Physical Features

1. The beaver's scientific name is CASTOR CANADENSIS.

2. The beaver is a rodent because it is a gnawing animal with teeth specialized to perform this function.

3. The beaver is related to the squirrel, woodchuck, gopher, and pocket mouse.

4. The beaver has lungs which take oxygen from the air.

5. An adult beaver averages about 3 to 5½ feet in length and about 40 pounds in weight.

6. Beavers must have a relatively close, wooded area in their environment.

7. The beaver's fur was a valuable commodity in the production of coats and hats. It was trapped in almost all parts of Canada and trading companies shipped beaver furs to all parts of the world. Canada was a rich source for these valuable furs.

8. (a) The beaver has 3 eyelids - 2 outer and 1 inner.
   (b) The inner eyelid is transparent and allows the animal to see underwater while still protecting the eyes agains injury from objects in the water.

9. (a) The beaver has 4 incisor teeth.
   (b) The two upper front teeth slide down over the two lower teeth (this could be demonstrated to the class). This results in a continual, automatic sharpening of the teeth.

10. (a) The front incisor teeth grow throughout the life of the animal.
    (b) The front incisor teeth grow continually because they are constantly being worn down as a result of the beaver's tree cutting activity and other dam, lodge building and maintenance activities.

11. The beaver has two flaps of skin behind its incisor teeth. These flaps fold inward and seal off the back of the mouth. The beaver can, therefore, gnaw wood on land or in water without getting splinters into the back part of the mouth.

12. The front feet are smaller, have long, thick claws and are used for digging and grasping. The back feet are large, are webbed with two split claws, and are paddles in swimming and diving.

13. The beaver uses its tail as a prop when it stands on its hind legs (during cutting operations, for example).

14. The inner layer of fur is composed of short, soft hair. The outer layer is long and heavy. The outer hair is basically for protection while the inner hair is for warmth.

15. The beaver has structural adaptations which enable it to perform its life activities. Some examples are:
    (a) teeth designed for cutting trees
    (b) mouth structures designed to facilitate tree-cutting operations.
    (c) legs and feet adapted for swimming and digging.

The Beaver Family

1. A typical beaver family consists of six members.

2. A family group consists of the adult male and female, the young born the year before and the newborn.

3. (a) Beavers live for up to twelve years.
   (b) The young are born in April or May.
   (c) There are generally from two to four in a litter.
   (d) Young beavers are called kits or pups.
   (e) The young remain with the parents for about two years.

Beaver Food

1. Beavers feed on the bark, twigs, leaves and roots of trees and shrubs.

2. Beavers prefer poplars and willows.

3. Beavers use stored food during winter. This is composed of branches and logs of trees which were cut during the summer and stored outside the lodge on the bottom of the pond or stream.

Beaver Tree-Cutting Operations

1. The beaver's head is turned sideways when cutting is being done.

2. The beaver begins the cutting operation with two initial cuts, an upper cut and then a lower cut.

3. The beaver normally cuts in a circular patter completely around the trunk of the tree.

4. The beaver runs to the water for safety from enemies which may be attracted by the noise of the falling tree.

5. The beaver removes the branches to reduce the width of the tree so that it can be more easily dragged, pushed, pulled, or rolled into the nearby water.

6. Beavers usually work at dusk, during the dark hours and at dawn.

Beaver Dams and Canals

1. Logs, branches, rocks and mud are used to make beaver dams.

2. The dam is strengthened by placing the poles so that the tips all lean in the same direction that the water flows.

3. The tops and sides of the poles are covered with wet plants, as well as with mud and stones.

4. The mud is held against the beaver's chest with the front paws.

5. The canals are used as pathways to move logs to the dam site.

Beaver Lodges

1. Beaver lodges are usually built on the banks or shores of ponds and creeks, or in the water like an island.

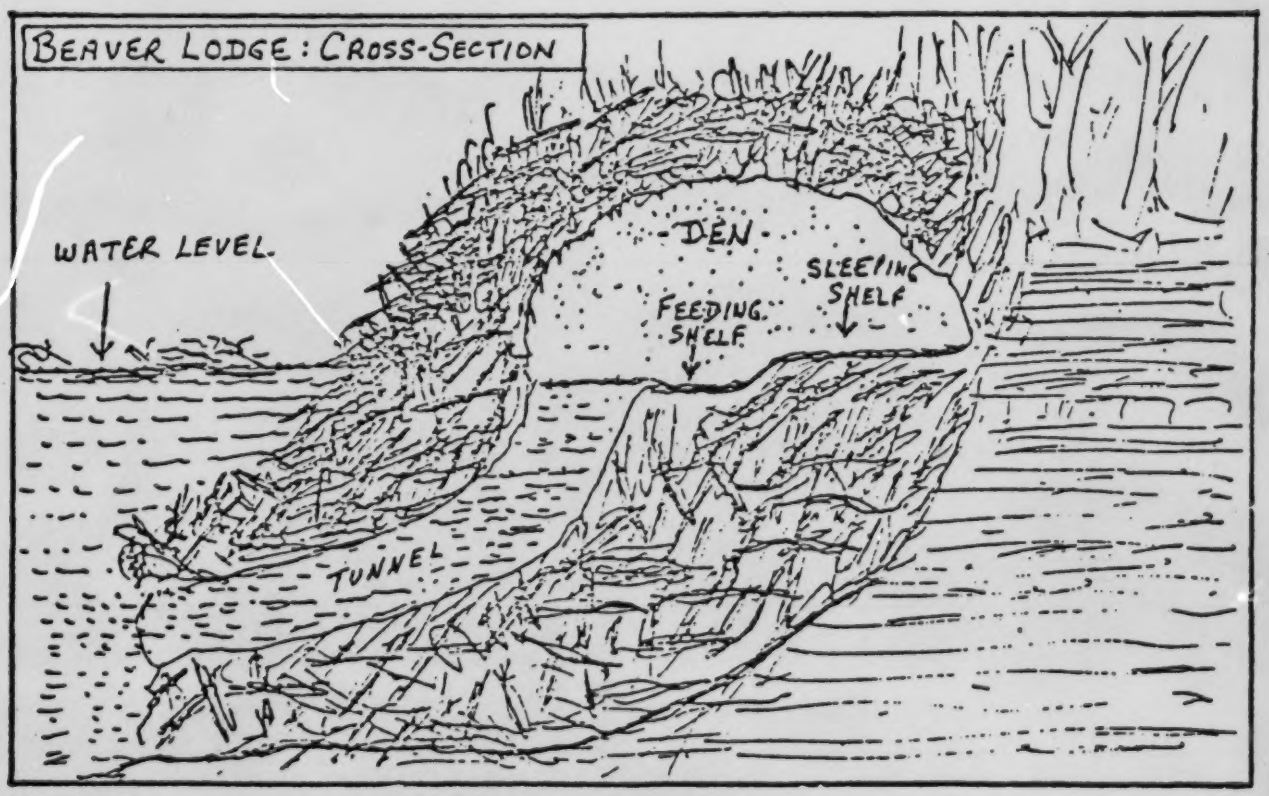
2. The top of the lodge is from three to six feet above the water's surface.

3. (a) Usually one room is found inside a beaver's lodge. However, some beavers may have an upper and a lower chamber in their lodges.
   (b) A beaver enters his lodge room through a tunnel in the floor. The tunnel is full of water.
   (c) The sticks, poles, etc. which make up the lodge have spaces between them which allow air to enter the lodge room.

4. A beaver abandons his lodge when all the food in the immediate area is used up or when enemies in the area present a continual threat to his life.

5. (a) Beavers may build dens in the banks of lakes and larger rivers rather than lodges.
   (b) These beavers are usually found in lakes and large, fast-flowing rivers.

6.



KEY

A. Map of City of Edmonton and Surrounding Area (General Area Map)

1 to 8. Answers will depend upon the location of the site. Many beaver habitats are located on creek meanders. If this is the case with your site, students could be given some background on stream meandering, oxbows, cut-offs, etc. to provide additional site information.

Activity #7 Beaver Habitat Site Map.

Suggestions

A transparency of the map would be most useful in going over site features with the whole class while students follow along on their own small maps.

KEY

1. Answers will depend upon location and type of site.

2. High-water levels will be found on the upstream sides of dams and low-water levels on the downstream sides.

3. In the Edmonton area, the main types of trees found in beaver habitats would include poplar, willow, birch and spruce.

Activity #8 KEY

1. The tree-cutting area is normally adjacent to the lodge and pond.

2. (a) Answers will vary. A well-selected area will have numerous cut trees (stumps).
   (b) Answers will vary. Common trees and their height ranges are given below:
   Willow - 1 to 4 m
   Birch - 6 to 14 m Adult heights
   Poplar - Up to 30 m
   (c) Answers will vary. Quite frequently tree-cutting areas have light growths, supposedly to allow for relatively easy access and removal of cut materials.
   (d) The most likely trees in the area will include willow, poplar and birch. The beaver prefers poplar and willow.
   (e) The presence of freshly cut trees and wood chips will indicate current cutting areas. Fresh cuts will have white surfaces.
   (f) All cutting areas would normally include some cut trees which were not carried away for one reason or another. Students might speculate as to the reason why. Possibly close examination of the tree, its location and position will reveal reasons for abandonment.

3. (a) Answers will vary. Students may be able to count the number of annual rings in the stump to determine the age.
   (b) If the stump is very small in diameter, it may be possible to detect individual tooth cuts.
   (c) Most areas will include both types of cuts. Students should be able to locate and identify these quite easily.
   (d) Wood chip sizes will vary depending upon the kind of trees, size of tree and size of beaver.

4. Most of these features should be visible at any typical tree-cutting area.

5. (a) Beavers make paths, trails or runways leading from the tree-cutting areas to the nearest water. Logs, branches and sticks are pulled, dragged, pushed and rolled over these trails. The paths are usually well-packed and show signs of dragging operations. Well-worn trails will have a central, dirt surface, with flattened grass edges.
   (b) Beaver trails are usually quite straight to reduce the distance (and work involved) in transporting the cut materials to the water.
   (c) Answers will vary.
   (d) Answers will vary. Students might speculate as to the correlation between the width of a trail and the size of trees in the cutting area to which the trail leads.
   (e) The grass and small,low plants along the edges of the trail will be flattened in one direction (toward the water).
   (f) The vegetation will be flattened down towards the water. That is, the tops of the plants will face in the direction of the nearest water.
   (g) As a path nears the water, it may form an inclined mud slide leading directly into the water.
   (h) The end of the path should be very close to the dam, although there may by many exceptions.

PART B - The Beaver Lodge and Surrounding Area

KEY - KEY PART B

1. Most of the lodges found on creeks are built on the sides or banks of the creek.

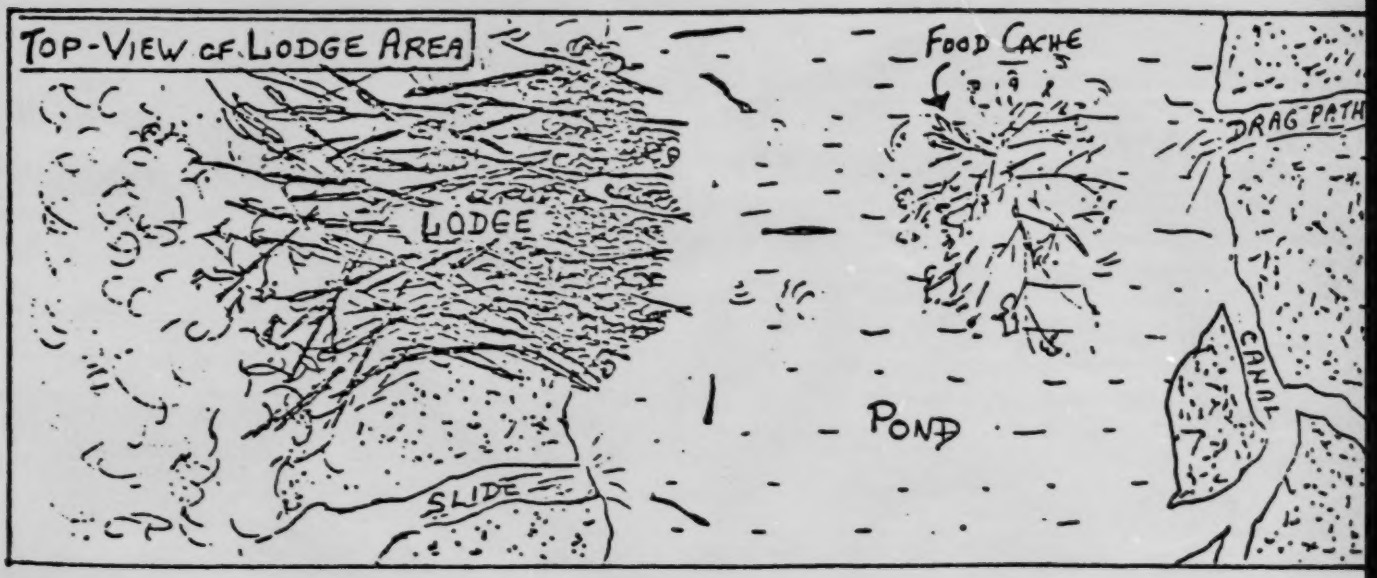
2. Answers will vary.

3. (a) The most common material is tree stems and branches
   (b) Other materials used include mud, stones, rocks and non-woody plants (weeds, reeds, grasses, etc.).
   (c) Dam materials are quite loosely packed.
   (d) Loose packing allows air to enter the lodge interior.

4. (a) The tunnel opening is usually quite difficult to find.
   (b) They are white because the bark has been eaten off.
   (c) Green leaves indicate that the trees were cut down very recently - the lodge is probably being used (being prepared for winter).
   (d) The hindfeet are easiest to find because they leave the largest and deepest prints.

5. Most of these features should be visible at and around typical beaver lodges. (Note: Bubbles may be seen rising in the water around the lodge. This may indicate that beavers are active at the bottom of the pond.)

6. A sample diagram is shown below:



KEY - PART C

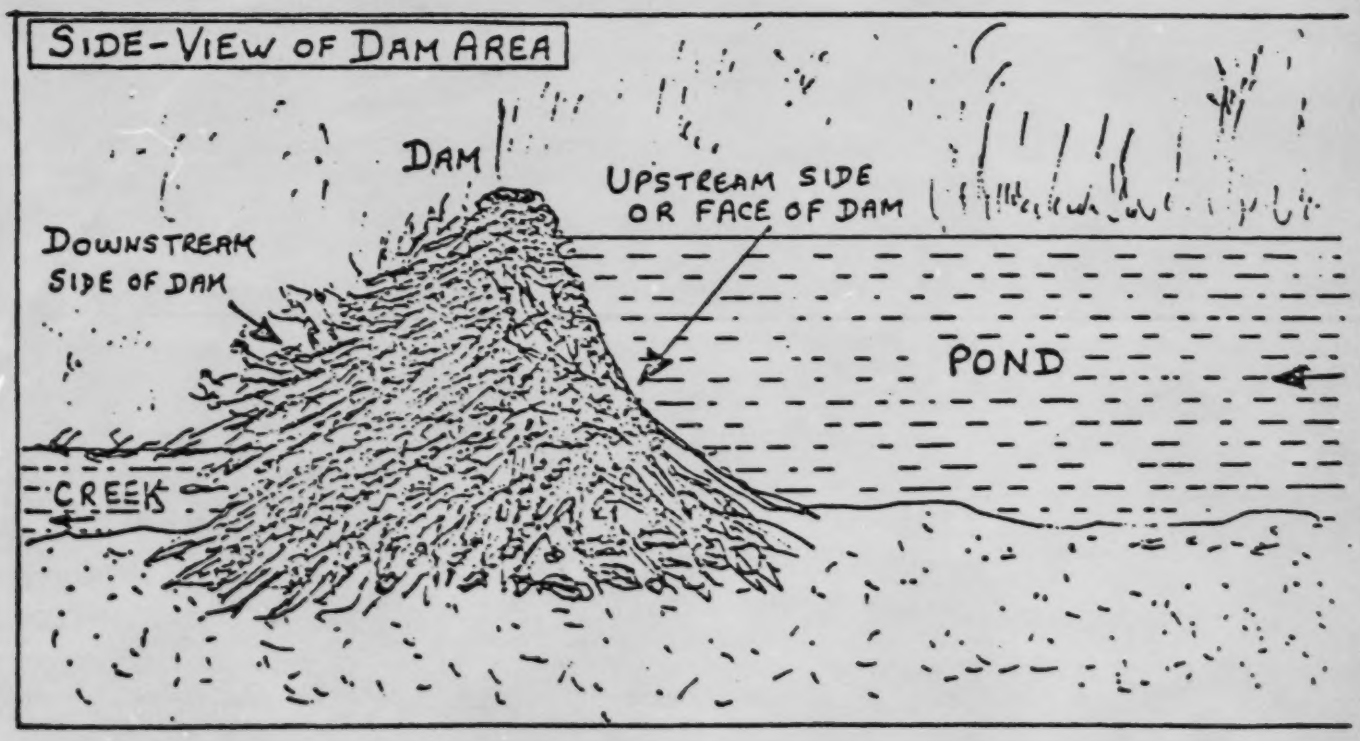
1. (a) Answers will vary.
   (b) The downstream side of the dam should give a good indication of the height of the dam.
   (c) Answers will vary, depending upon such factors as width and depth of creek, rate of flow of water, size and location of dam, and water-retaining capacity of dam.
   (d) Both curved and straight dams can be found.
   (e) The upstream side (face) will likely be most even because of the force of the water against this side.
   (f) Most dams are not completely water-tight. Small trickles will be seen and heard in all dams. Active dams must be regularly repaired and maintained.
   (g) The upstream side (the pond) will have the quietest water because of less movement.
   (h) When the moving creek water (carrying sediments) enters the still pond water (on the upstream side of the dam) it slows down and all the materials which it carries settle to the bottom.

2. (a) Trunks and branches of trees are the most common materials used in building dams.
   (b) Other materials used in dam construction would include shrubs, grasses, water plants, leaves, twigs, mud, etc. Many materials carried by the stream will also be found (e.g. boxes, cardboard, bottles, tires, cans, paper, etc.).
   (c) Mud, leaves, grasses, water plants, etc. are used on the face of the dam to help seal holes and spaces.
   (d) See #c above.
   (e) Most of the logs are placed so that the tips all lean in the same direction as the water flows.
   (f) Vertical logs are found in most dams.

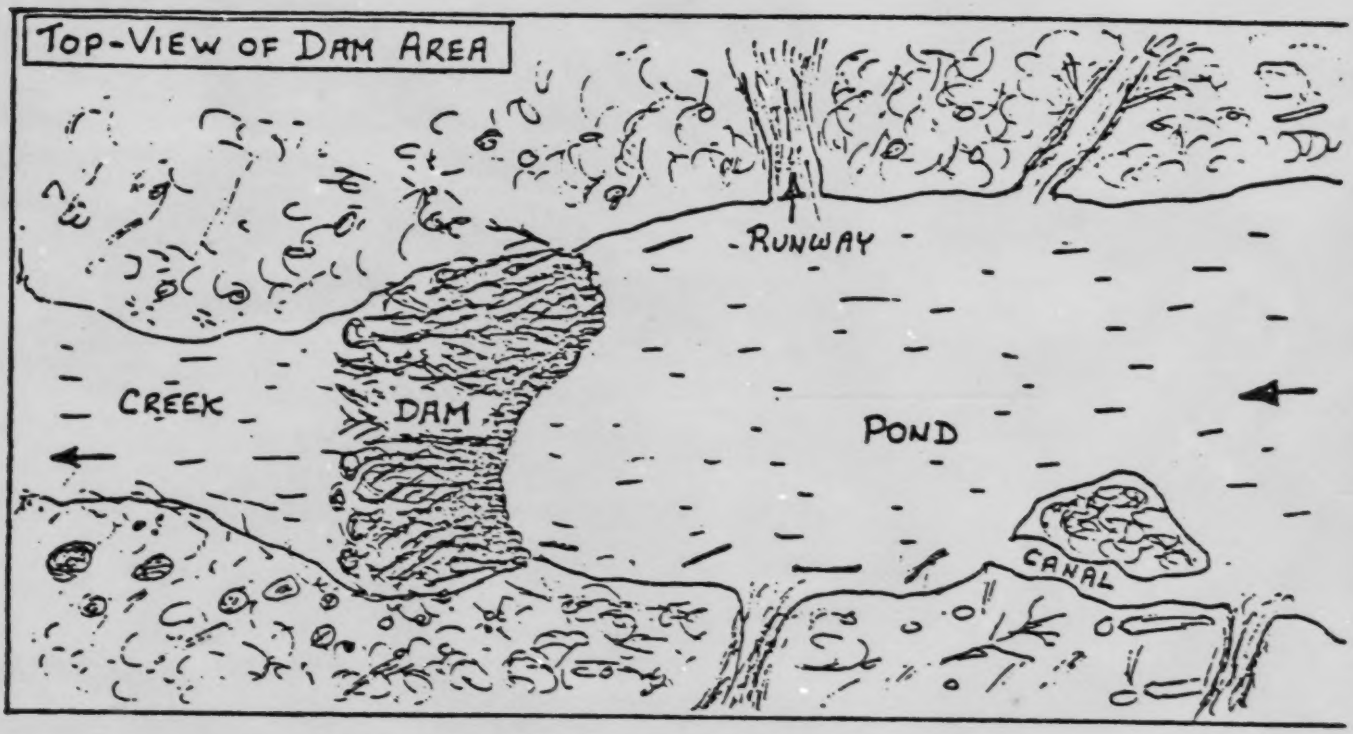
(g) The interlaced logs, sticks, branches, twigs, bushes, etc. form a strong latticework that is further compacted by the pressure of the water.
(h) The presence of freshly cut logs, and branches in or on the outer parts of the dam will usually indicate that it is being worked on. Still-green leaves on cut branches and logs give further evidence that the dam is currently being maintained.
(i) The dam would reduce the water flow (volume) on the downstream side.
(j) The creek on the upstream side (the beaver pond) should normally be wider and deeper than it was before the dam was built. The dredging of the upstream side by the beavers, as well as the backing-up of the water will increase the water depth.

3. Most of these features should be visible.

4. A sample diagram is shown below:



5. A sample diagram is shown below:



Activity #9 - The Beaver and Its Environment

SUGGESTIONS

This section and the remainder of the investigation should be done as a post-lab, classroom activity, following the field site activities in Part A, Part B, and Part C. Emphasis should be placed on the basic idea that the beaver affects its biotic and abiotic environment in many ways.

KEY - PART C

1. Examples of biotic changes would include:
   (a) Some plants and animals in the wooded area and pond would either move or die because of changed conditions. (e.g. shortage of trees).
   (b) New plants and animals would enter the wooded area and pond because conditions are to their liking. (e.g. frogs would come into pond).

   Example of abiotic changes would include:
   (a) Wind velocity might be higher in wooded areas - less tree protection.
   (b) The wooded area would be sunnier and lighter.
   (c) The soil in the wooded area would change because leaves and other plant parts would not be as numerous.

2. See #1 above.

3. The beaver's length of stay will depend upon the extent of the trees in the immediate area, and the presence or absence of enemies, including man.

4. This statement means that the beaver has special body parts which permit it to perform activities which it needs to exist (live and grow). Some examples are:
   (a) Teeth - adapted for cutting trees.
   (b) Claws - adapted for grasping trees and digging.
   (c) Mouth Flaps - adapted for preventing chip swallowing.

5. The students (and teacher) in the class represented biotic factors. Whenever new biotic elements enter an environment, they cause changes in the environment. Examples of these changes are:
   (a) Stepping on plants and animals may kill or harm them.
   (b) Animals which normally live in the beaver habitat are frightened away by human intruders.

KEY - FURTHER EVIDENCE

1. Some of the changes resulting from the introduction of the beavers to an entirely new area might include:
   (a) Increases in some populations and decreases in other.
   (b) Change in dominant plants in the area.
   (c) Formation of a pond would destroy some animal homes, animal food sources, etc. while at the same time providing more suitable conditions for other animals (and plants).
   (d) Reduced downstream creek flow would affect plants and animals living in and around the creek.
   (e) Influxes of some animals and migration (to more suitable environments) of others.

KEY - NEW PROBLEMS

1. Plants - Large, tall spruce trees will shade the area below them and cause the smaller, shorter plants to die.
   Animals - Large, carnivorous fish or other aquatic animals found in relatively small bodies of water will reduce the populations of other animals found in the water. This will of course have a chain effect.

2. Examples of changes are:
   - Poplar and willow trees will not be part of the plant population of the immediate area until regrowth takes place.
   - The animal life (e.g. birds) associated with these plants will be affected.
   - With more growing space and more sunlight, smaller plants such as herbs and shrubs will flourish as will the animals associated with them.

3. The stumps and trunks left by the beaver will decay and develop into typical "rotting-log" communities containing a variety of plant and animal decomposers. All the materials in the stumps and trunks will eventually be returned to the air and soil.

KEY - APPLICATION

1. The goldfish introduced to a non-goldfish aquarium could correspond to a beaver coming into a non-beaver environment. As a result of its presence, the biotic and abiotic environment would change. Some of the changes might include:

(a) Disappearance of certain populations because they would be used as a food source by the goldfish.
(b) Disruption of food chains and food webs amongst aquarium populations.
(c) Changes in composition of water.
(d) Changes in ecological niches of some organisms. E.g. predator organisms may become prey.

Activity #10 Beaver Habitat Unit Test

Part A : Fill in the blanks in the following statements with one or two words taken from the list below. You may use a word more than once.

Carnivore	birch	paddling	incisor
Castor	pups	diving	digging
Rodent	same	canine	jumping
canis	lower	outer	tail
3 to 4½	longitudinal	floor	hind
6 to 7½	circular	slides	front
poplar	upper	logs	short
willow	swimming	wall	long
calves	grasping	forty	soft
opposite	breakdown	sixty	heavy
pathways	branches	inner	flaps
layers	kits	day	night
one	two	three	six
sharpening			

1. The Genus name of the beaver is _____ .

2. The beaver is a _____ because it is a gnawing animal with teeth specialized to perform this function.

3. The adult beaver averages about _____ feet in length and about _____ pounds in weight.

4. The beaver has _____ eyelids: _____outer and _____ inner.

5. The _____ eyelid is transparent and allows the beaver to see under the water while still protecting the eyes against injury from objects in the water.

6. The beaver has four _____ teeth.

   The two upper teeth slide over the two lower teeth resulting in a continual _____ of teeth.

7. The front _____ teeth grow throughout the life of the animal.

8. The front feet are used for _____ and _____ and _____ .

9. The back feet are used like paddles in _____ and _____ .

10. The beaver _____ is used as a prop when it stands on its _____ legs.

11. The inner layer of fur is composed of _____ hair, and outer layer is _____ and _____.

12. Part B: True or False. Place a T for True and F for False in the space provided for each sentence.

_____ 1. The scientific name for the beaver is Castor domesticus.

_____ 2. The average weight of an adult beaver is approximately 20 kilograms.

_____ 3. Beavers must have a relatively close, wooded area in their environment.

_____ 4. The beaver is Canada's national animal emblem.

_____ 5. The beaver has six incisor teeth.

_____ 6. The beaver has a built-in comb in his front paws for combing his fur.

_____ 7. The typical beaver family consists of four members.

_____ 8. Beavers prefer birch trees over poplars.

_____ 9. It would take a beaver about 15 minutes to fell a tree 10 cm in diameter.

_____ 10. The beaver has an undercoat of fine fur for warmth and an overcoat of coarse fur for protection

_____ 11. A beaver may be able to stay under water for 20 minutes.

_____ 12. Most trees used by beavers are less than 25 cm in diameter.

(10) Part C: Write a paragraph explaining why you think the beaver is an unique animal. Be sure to write good sentences; spell properly; and write neatly.

DAIRY FARMING

Gerald Bonnema

MAJOR THEMES

Dairy farming for Grade A milk production, with emphasis on herd reproduction and the milking process.

TIME

Time is divided as follows:

		Periods	Pages
I	The Holstein	4	1 - 5
II	Herd Reproduction	2	6 - 9
III	Milking	1	9 - 12
IV	Culling	3	12 - 16
V	Field Trip	2	17 - 20

In addition two periods should be allowed for presentations by guest speakers.

SUBJECT AREAS

In the Program of Studies for Junior High Schools, Alberta Education, 1978, this unit's objectives fall mainly in the Science area under Electives, as a locally developed unit with practical application of a core topic, reproduction. It also applies to the Language Arts curriculum under Research, Study, and Composition, and to the Math curriculum under Graphing, Ratio and Proportion, and Rational Numbers.

RATIONALE

To improve milk production the dairy farmer must apply a knowledge of inheritance, variation in populations, and the reproductive process. The considerations for handling the herd, based on that knowledge, are many, and afford the student of life science the opportunity to see theoretical knowledge applied.

Much of the Grade seven science program is theoretical and students welcome the chance to study and observe a very practical, but scientific, operation.

The subject lends itself very well to integration with the language arts and mathematics curriculum. Processes such as milking,calving, and feeding require description; culling and breeding require careful record keeping and numerical manipulation.

Guest speakers and resource materials can easily be obtained through Alberta Agriculture District Offices at Leduc (Box 248) and Stony Plain (Box 510). Staff are familiar with experienced speakers from various agricultural organizations, marketing boards and the like, and will provide contacts to arrange farm visitations.

Field trips are short, usually a few hours, because one need not go far from Edmonton to find a dairy farm. Usually they are after school during milking time, when they do not interfere with regular class attendance.

INTENTS

It is the broad goal of the writer to familiarize the student with the day-to-day concerns of the dairy farmer as he operates to improve yields of his herd. He has to use a definite schedule of milking,feed cows according to the nutritional requirements of their breeding cycle, detect cows in heat, treat diseases, and numerous other things. When the student studies dairy farming, he should get the impression that dairy farming is a very structured, scientific pursuit.

ACTIVITIES

The following section discusses each of the activities of the unit. Reference is made, at first, under each heading, to the Alberta Education Program of Studies for Junior High Schools, objectives, 1978, or to the Edmonton Public School Board Junior High Mathematics Consortium objectives, 1981. This is followed by comments on the teaching of the objectives. An overview of the activities follows:

Learning Activity	Objective
(1) Graphing	Math (E.P.S.B.): To construct a bar graph
(2) Butterfat Production	Math (E.P.S.B.): Solve problems with percent Science (Alta.Ed.): Manipulate data to identify variables
(3) Review	Science (Alta.Ed.): Assimilation of scientific knowledge
(4) Library Research (5)	Lang.Arts (Alta.Ed.): Become familiar with a variety of sources of information, and summarization skills
(6) Breeding Cycle	Math (E.P.S.B.): Graphing, using number lines
(7) Application of (8) Breeding Cycle (9)	Lang.Arts (Alta.Ed.): Interpreting charts, diagrams and graphs
(10) Milking	Lang.Arts (Alta.Ed.): Summarization skills
(11) Culling	Math (E.P.S.B.): Addition and subtraction of whole numbers; addition and subtraction with decimal numerals; multiplication and division with decimal numerals; rounding off decimal numerals; and solving problems with percent.
(12) Field Trip	Science (Alta.Ed.): Observing with all the senses; quantifying measured data. Lang.Arts(Alta.Ed.): Broadening personal experience of the physical world through listening, reading and viewing.

Activity #1 Graphing

This activity corresponds with objective 4-S of the math curriculum (E.P.S.B.): "Construct ... bar graphs ..."

The student should be left to choose scales, title and bar separation if he has had previous graphing experience. The teacher should review the steps of bar graph construction.

If the student has had no experience, a transparency showing all details of the graph should be prepared. The reasons for choosing scales, etc. should be discussed and the student should make his own replica.

The graph should be marked and returned to the student for inclusion in his notebook.

The pictorial comparison of quantity of milk produced is more impressive than the numerical one given. It will emphasize how substantially the Holstein outproduces other dairy cows in milk production and gives a good reason why she is the most common dairy cow in Canada and the Edmonton region. With that in mind the unit continues with reference to only the Holstein.

Activity #2 Comparing Butterfat Production

This activity corresponds with math objective 9 (E.P.S.B.), "solve problems with percent," and science process objective (Alta.Ed.) "manipulate data to identify patterns."

Students should be shown how to find the percent of a number in the form:

$$3.85\% \text{ of } 4\,133 \text{ kg is } n$$

$$\frac{3.85}{100} \times 4\,133 \text{ kg} = n$$

It is not immediately apparent which breed of cow produces the largest quantity of butterfat annually. Students guess it is the Jersey because of its high percentage of butterfat. When they calculate how much is actually produced they see the real pattern.

Activity #3 Review

This activity asks students to recall the previous information and clarify the perspective of the unit. It assists in the "assimilation of scientific knowledge" (Alta.Ed.).

Activities #4 & 5 Library Research

These activities correspond with language arts objectives (Alta.Ed.): "Learning and becoming familiar with a great variety of sources of information ..." and the acquisition and application of "summarization skills."

Most encyclopaedias have a labelled diagram of the cow and can be used to complete the diagram. Rules of scientific diagramming require use of a pencil and small, printed letters only.

Answers for the definition section should be taken, preferably, from reference books and pamphlets on dairy farming. Students should be encouraged to record several definitions for each on a separate sheet before selecting and recording one in their unit. If they devise ones of their own, they should be checked by the teacher before they are recorded.

To complete the paragraph on the Holstein, the student should gather a number of facts and the teacher should later explain how to select ideas, introductory sentences, grouping and ordering of facts, and closing sentences. A rough copy should be corrected by the teacher and a final copy made for inclusion with this unit.

The purpose of this section is to teach terms that will be used later in the unit, and to familiarize students with the Holstein breed.

Activity #6 The Breeding-Milking Cycle

This activity corresponds with math objective 4-2 (E.P.S.B.) on graphing in general and requires skills similar to those used in making number lines.

Students should read the section on the breeding cycle and the teacher should summarize the facts to be used on the time-line; gestation period, period between pregnancies, periods of heat, periods between heat.

Here the teacher should begin to stress that the dairy farmer must keep detailed records for each cow if he wants to get an income from his investment. The cow should calve once a year and should be served immediately after the "rest" period.

Time should be taken at this point to learn how to read the printout of information on the "Edith Rogers Dairy Herd."

Activities 7, 8 & 9 Application of Breeding Cycle

These activities correspond with language arts objective (Alta.Ed.) "interpreting charts, diagrams and graphs." They do not precisely fit E.P.S.B. or Provincial Government math objectives but approximate E.P.S.B. objectives in graphing, where tables are read and coordinates are found.

The teacher should guide the student through the interpretations of the tables on pages 7 and 8. Students should be in a position to judge, as the dairy farmer has to, which cows should be prepared for calving and which cows should be served on next heat.

Activity #10 Milking

This learning activity corresponds with Alberta Government, 1978 language arts objectives on summarization skills. It is intended to teach reading in the science area.

The teacher should, after correcting the answers on page 12, return to Activity 6 and plot the milking part of the cycle on the time-line. He should separate out of the information just given, the dry period and the milking period.

It is intended that the student perceive milking as a well-orchestrated activity, where the parts of the process are well-timed and sequenced. The student should have an overview of the yearly milking schedule.

Activity #11 Culling

This learning activity corresponds with E.P.S.B. math objectives "addition and subtraction of whole numbers," "addition and subtraction with decimal numerals, "multiplication and division with decimal numerals," and "round off decimal numerals."

#11 combines the knowledge of breeding and milking to cull undesirable cows from the herd. Calculation of performance in both areas is required.

First to be calculated is breeding time. The teacher should start with asking the student if he can calculate his own age in years, months and days. The problem should be set up as on page 13, and several examples where borrowing is required should be used. For purposes of calculation all months are considered to have 30 days.

Multiplication with decimal numerals should be reviewed, and all answers should be rounded off to the tenths position. Tables should be interpreted.

When all the calculations are done, the student can easily select the five poorest cows. They are the two poorest breeders and the three poorest milk-producers.

Activity #12 Field Trip to a Dairy Farm

This section is intended to round out the student's knowledge of dairy farming. Areas not covered were feeding, detecting and preventing disease, marketing and the like. It is a general section that meets with Alberta Government science objectives "observing with all the senses" and "quantifying measured data." Also one of the Alberta Education language arts objectives met is: "Broadening personal experience of the physical world through listening, reading, and viewing."

This activity should be directed to overcoming these shortfalls - hence the constructed outline - but also this should be an opportunity for the dairy farmer to explain his operation without too much direction, and a chance for students to freely ask questions that come to mind.

RESOURCES

The two main sources of information are the District Agricultural offices at Leduc (Box 248) and Stony Plain (Box 510). These offices will supply a Farm Guide, brochures on dairy farming in general, and even an economic analysis of a dairy operation. They are in contact with farmers throughout the region and will find guest speakers and farms for visitation. Unfortunately, their film files have no films specific to dairy farming.

The guest speakers provided were:

Garth Roswell — Box 204, R.R. #6
Edmonton, Alberta T5B 4K3

Russel Cain — Cain Cattle Company (beef cattle)
General Delivery
Leduc, Alberta

The field trip was to:

G. Goodreau
General Delivery
Leduc, Alberta

Brochures and childrens' books on dairy farming can be obtained through school and public libraries. The sources used as references and construction of the program were:

Ensminger, M.E. Dairy Cattle Science, The Interstate Printers and Publishers, Inc., Danville, Illinois, U.S.A., 1971

Friend, J. and Bishop, D. Cattle of the World, Blandford Press Ltd., Link House, West Street, Poole, Dorset, Great Britain, 1978.

Juergenson, E.M. and Mortenson, W.P. Approved Practices in Dairying, The Interstate Printers and Publishers, Inc., Danville, Illinois, U.S.A., 1977.

Russell, K. The Principles of Dairy Farming, Page Bros. Ltd., Norwich, Great Britain, 1977.

EVALUATION

Students were evaluated by giving them the assignment below. Comprehension of the basic processes of dairy farming were assessed and found to be reasonable for the grade seven level. A less global evaluation of specific facts was not possible due to constraints of time.

Overall, the project was quite successful. The students were pleased with the very practical aspects of the program: reading tables to predict when a cow would calve, calculating age in years, months and days, and being able to interpret what seemed like a very complicated computer-type herd summary. They took pride in being able to understand these things and were competitive in their approach to learning them. Several stated how pleased they were to be doing this rather than the other (theoretical) parts of the science program.

The program was rewritten as it was taught. Right after student testing, the writer revised the program to make it more suitable. What is in the presentation here is the revised program (also given to students). The one section needing upgrading is Learning Activity #6, where a shaded time-line should be used to show the breeding and milking cycle. This will be revised when the unit is next used.

Student Evaluation - Dairy Farming

1. Describe the breeding cycle of the cow.

2. Describe the milking schedule of the cow.

3. How is it decided which cows should be culled from the herd?

4. Describe the Holstein cow and explain why she is so widely used in dairy farming.

DISASTERS

George W. Smith

MAJOR THEMES

There are two major themes. First, natural disasters which are mostly scientific in nature. Second, man-caused disasters which relates equally well to the areas of science, social studies and language arts curriculum of junior high school.

Natural Disasters

- Weather: wind: cyclones, tornadoes, hurricanes, precipitation: droughts, floods
- Geological: earthquakes, volcanic eruptions, landslides, tidal waves

Man-Caused Disasters

- Environmental: air, water and land pollution
  population explosion, extinction of species
- Personal: loss of family: death, divorce
  loss of capabilities: physical, mental
- Social: crimes: murder, robberies, rape, etc.
- Political: terrorism, dictatorships, violations of human rights

TIME

Activity 1 = 6 periods
" 1A = 2 periods
Activity 2 = 4 periods
" 3 = 3 periods
Activity 4 = 4 periods
" 5 = 7 if both Journal plants visited, 3 if only one

SUBJECT AREAS

"Disasters" lends itself to science, social studies and language arts.

RATIONALE

Junior high students have difficulty discerning what is and what is not really important to their lives. Some things which are not very serious are magnified into major problems by their imaginative minds and things which seriously affect the quality of their life are of very little concern.

Newspapers are full of disasters devoted to the negative aspects of life herein called disasters. It seems that if all these negative articles plus the sports, leisure and advertisements are removed from the paper only the comics will be left.

If these disaster stories are examined and evaluated in detail by students, the students may be educated as to the causes and effects of these disasters. If the students are allowed to form their own opinions about the severity of a variety of disasters, they may then be in a position to rank these disasters in terms of importance. Although each student will probably rank some

individual disasters differently, all students should be able to comprehend that there is a need for improvement in our world today.

As this is a highly motivating topic there is no prerequisite knowledge or skills necessary although it is recommended that the construction of dichotomous keys has been finished in grade seven science and that the students have learned to group social studies readings as either social, economic or political in content. This unit will then serve as an excellent follow-up exercise. You may, however, use this unit as an introduction to these subject areas but the time span will be approximately doubled from twenty periods to forty. Many of the newspaper articles lend themselves to both social studies and science.

INTENTS

The main intent of this unit is to have students study the topic, 'Disasters' as major crises directly affecting some or all segments of our population. The intent here is to have the students learn what criteria are necessary to judge a disaster as a disaster. Second, what type of disaster it is. Third, the students will be encouraged to form opinions which can be defended. Fourth, what type of aid should be given to assist those whom the disaster directly affects? Fifth, what can be done to prevent such a disaster in the future?

SPECIFIC OBJECTIVES

The student will learn to evaluate newspaper articles (language arts, social studies).

The student will learn to classify disasters. This particular section nicely reinforces or serves as an introduction into the grade seven classification unit. (classification unit, science).

The student will learn to rank articles according to relative importance. The student will learn that different students rank things differently and that both may be right depending on the criteria used. (values unit, social studies).

The student will become involved in assisting victim(s) of a disaster. This may be by monetary donation, letter of sympathy, etc., so long as the student gets involved (language arts, social studies).

The student is required to write a report on a disaster of their choice. The theme is 'Disaster, A Preventative Approach'. (lang. arts, social studies).

ACTIVITIES

Activity #1

From a large supply of newspapers (either brought from home or preferably saved by the teacher thus giving a wide range of different editions) have the student select one. The student then places his name in a prominent position on the front cover. The student then reads the paper from cover to cover. The student is then informed that he or she is to select 25 different headlines from different

sections (to ensure variety) of the paper. If the students have not learned how to make a dichotomous key (a dichotomous key is a schematic drawing which separates subject matter into two parts and it describes the kind of choices you make in using such a key) they are given that information (this will extend this unit to approximately 12 periods). The students reread the articles with a view in mind of choosing 8 articles of a serious nature (disaster) to fit a dichotomous key. The students complete two keys on the 8 articles one of which is a master copy (complete with headline). The students pass their non-master key to a classmate who attempts to fit the headlines into the key. The student is then evaluated according to the accuracy of their key. This activity should take 6 periods to here.

The use of the dichotomous key is recommended here. It provides the students with a way to separate articles into different groupings. It helps students decide whether an article is social, economical or political. In addition, the use of the key here reinforces its application in the classification unit of grade 7 science. Grade 7 students have great difficulty constructing dichotomous keys. This activity was designed to reinforce this area and the additional, associated problem area in social studies where they find it difficult to group subject matter into social, economic or political categories. As the newspaper has not been written specifically for the grade 7 level and the dichotomous key will not be constructed from animals and plants this activity can be a challenge to the more gifted students while its highly motivating nature ensures that the poorer students can also be successful.

A dichotomous key from the grade seven science curriculum C.R.I.B. bank is included in this unit to help teachers who are not familiar with them. This may serve as an introduction into making the key out of newspaper articles. The answers for the key are included and three multiple choice questions are included for further evaluation if needed.

Activity #1A

From the same 8 articles used in the dichotomous key, the students will determine whether each article is social, economic or political in content. The students list the article's headline under the appropriate column with a brief explanation on why they chose that grouping. If the article is equally applicable to more than one grouping then they list it in those groupings complete with explanation. It may be necessary to review that: social corresponds to mental needs (Mental needs are those needs that affect a person's mental state. If they are not satisfied, the person with the need will feel some unpleasant mental sensation); economic corresponds to satisfying physical needs (Physical needs are those that affect the body. If they are not satisfied, the person with the need will feel some unpleasant physical sensation); political corresponds to satisfying group needs (Group needs are needs that affect how well groups operate. If they are not satisfied, the group with the need will have trouble staying together). Two periods of social studies, total of 8.

There is no orientation lecture at the beginning so that the students will read all of the paper and are not selective in what he or she reads. The choice of the newspaper for the first activity is that it provides many articles on disasters that are highly interesting and in very readable form. The use of the newspaper lends itself later for a field trip to a newspaper plant where the students will find out exactly how the paper is produced. Student tours may be arranged by phoning the Edmonton Journal.

Activity #2

From the list of books supplied with this unit or made up from your school library have the students choose a book to read and write a report on the disaster(s) discussed in the book. The report can be evaluated by the language arts teacher who gave at least three class periods initially to allow students to get a good start on the book and one more period later to have them actually write the report. The report would be the evaluation and is equally applicable to social studies with the periods taken out of this subject area.

Reading is an essential part of the grade 7 curriculum and this activity should enhance this area plus provide another activity to develop the writing skills so essential to social studies and language arts programs. There are enough books on disasters in the library to assure the students have a reasonable chance of selecting a book that will be of interest to them. Class time = 4 periods (social studies, lang. arts).

Activity #3

The students are put into groups (size may vary according to teacher preference). The students search their newspapers for a disaster article which motivates them to want to give assistance to the victims of that disaster. Students are encouraged to write letters of a positive nature or give offers of a physical nature (donate time, etc.). It is best to use a pass-fail approach to this activity with personal satisfaction being a reward in itself. Giving help gives the student a feeling of satisfaction and it was felt that this part of the unit would tie the unit together and make it far more meaningful to the student even though it would be the part least evaluated. This activity would take two periods with an additional period be given at a later date optional if the feedback from the disaster victims warranted it. (social studies, lang. arts).

Activity #4

The students use the library and classroom to write a report titled 'Disasters, A Preventative Approach'. They will choose a disaster that was not involved in activity #2 or 3 so that a variety of disasters are covered by this unit. To allow them the widest range of disasters, the teacher should place the disasters listed on page one of the teacher's manual on the blackboard. The students will then outline a report whereby disasters of the type chosen may be lessened or eliminated. In order to do such a report the student must know the causes and effects of the disaster. Students must take a practical approach otherwise there is no purpose to this activity. Evaluation by oral report with a text of the report also submitted was given a letter grade. This activity is hard to evaluate. The major purpose of this activity was to show students that there are ways to make life better but it is very difficult to effect the desired changes due in large part to human nature. It is hard to get people to stop driving cars even through they know the exhaust is polluting the atmosphere. Four class periods are given. (social studies, lang. arts, science).

Activity #5

The students go on a field trip to the Edmonton Journal to see how the paper is produced. This activity is a culminating exercise and allows the unit to end where it started with a newspaper. Students like field trips and this field trip is very educational in that the newspaper is more fully appreciated by the students and it is only appropriate that the sensationalism of its articles so well used in activity #1 is tempered by the knowledge gained on the field trip. The field trip should take either ½ day (if just the production plant is visited) or a full day if the downtown plant and the production plant are both visited. (social studies, language arts). Not evaluated.

RESOURCES

The daily copies of the Edmonton Journal and the Edmonton Sun saved from September and stored in the classroom.

'How to make a dichotomous key' from the grade 7 science C.R.I.B. bank.

Blank dichotomous keys

Disaster book list compiled by Heather Etsell, librarian ERJH.

EVALUATION

The students were very interested in reading the paper. The male students mostly turned immediately to the sunshine girl but a short time later began to read those articles that caught their eye. They tended to skip around quite a bit and it is probably not best to have them read the paper in order of page 1 to end. Many students reported they did not like to read about disasters from the feelings that these articles generated and yet they did find it exciting to read these articles. They expressed some fear that these disasters could also happen to them. Parents of one student were impressed that a major part of this unit could be done outside the classroom while the child was on vacation which cut into classroom time. That student did activity #1 while vacationing in California with Calif. newspapers.

The dichotomous key was easy to evaluate and the students liked trying the other keys of his classmates. This unit also gave other application to dichotomous keys rather than just classifying animals and plants into groups. Students realized in the section that they had to read the article thoroughly to establish what the article was trying to say. This was especially important as the students tended to key the headline wrong unless they had done more than glance through the article.

Newspapers must be kept in the room and not removed for any reason. There were many papers missing in the first week of this unit as other students misplaced or stole another's paper. This problem was rectified by the student placing his or her name prominently on the front cover and making the other students aware that this paper was his. It was found to be useful, albeit too late, for the teacher to record the date of each paper after the student's name in the markbook so that the dates of papers were not duplicated and for those students whose front cover became so mangled that they could not identify their paper. Also, it would be possible to find another paper if it were lost.

It was found to be necessary that students be instructed to neatly pile their papers into a prearranged spot and that this spot must be adequate to store papers vertically. the spot is better if it is out-of-the-way so that the papers are not read by other classes. Newspapers were disseminated by name with the student on top receiving theirs first. This is absolutely essential, otherwise too much class time is used and the papers mishandled. I learned this the hard way. Although I originally had this exercise arranged such that the articles were clipped out, it should be noted that it is far better to leave the articles in the papers (less mess, and both sides of the page could be used). It might be worthwhile to laminate one of the better sections of each activity to serve as a role model. These could easily be placed on a bulletin board.

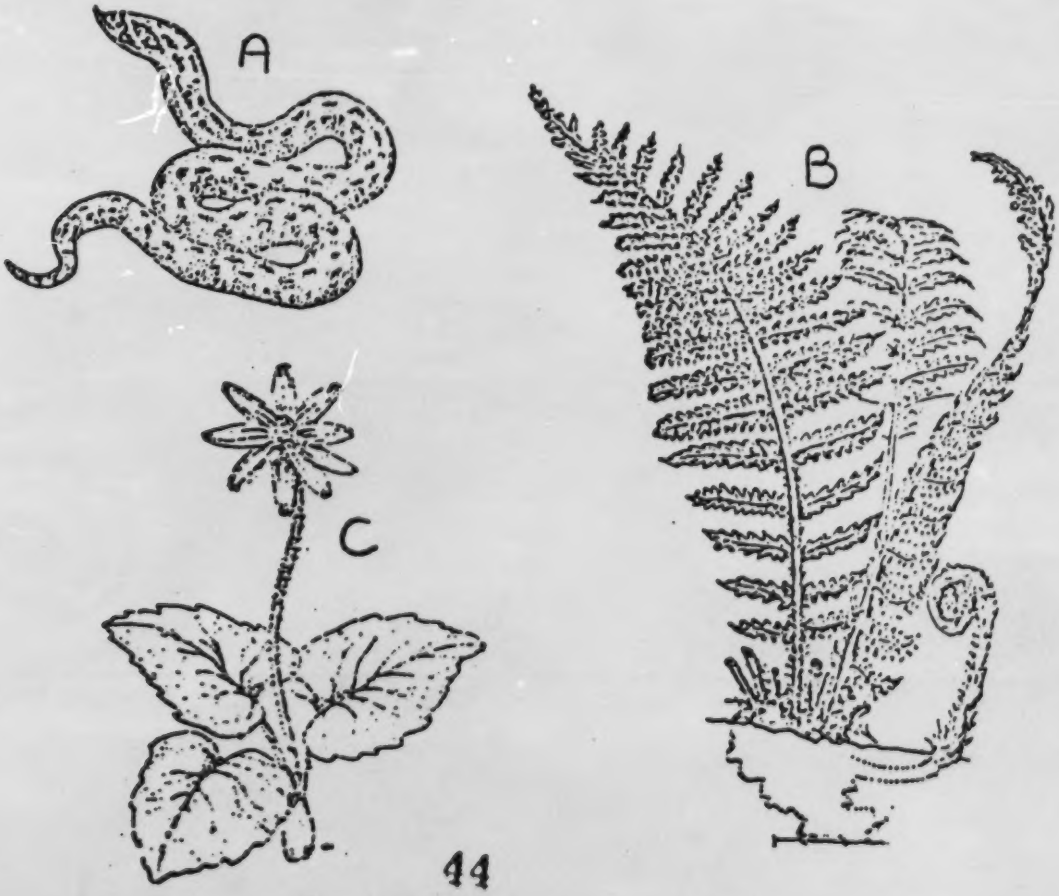
Activity #3 concerning assistance of disaster victims was optional with some of the students giving financial aid to charities like the SPCA. The group approach should work well with several opportunities to involve students in worthwhile activities. This unit was not evaluated because I could not come up with reasonable criteria. Perhaps a pass-fail mark or bonus points could be given although the feeling of self-worth should be enough to motivate the students.

'Disaster, A Preventative Approach' was evaluated orally and it was felt that this approach should be used again with a text also being submitted. This year not all students were evaluated as time did not allow us to have 24 oral talks and the marks were discarded.

The trip to the Edmonton Journal was very worthwhile with the classes of students thoroughly enjoying themselves although several had been to the production plant before in an earlier grade. This is well recommended but in our case this activity took place too long after the other sections of this unit were finished due to scheduling errors by the Edmonton Journal.

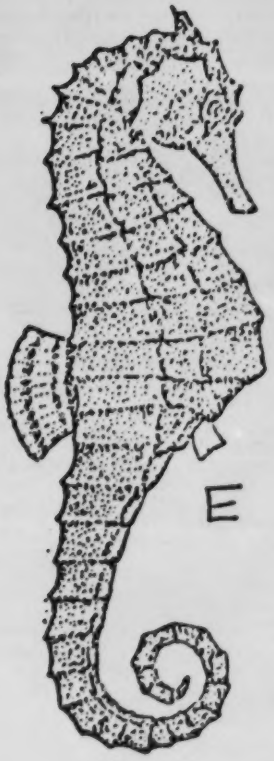
This unit was originally thought up by my blockpair teacher who is a language arts specialist so this unit is very adaptable to at least three of the core subjects. My blockpair was very responsive in carrying out some language arts components of this unit. He arranged the field trip to the Edmonton Journal plant.

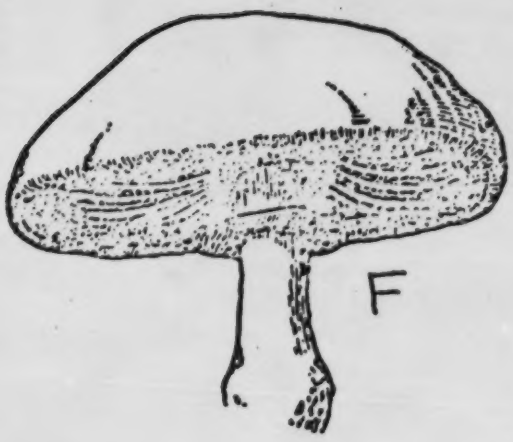
Using the pictures given below answer questions 1-2



44

D

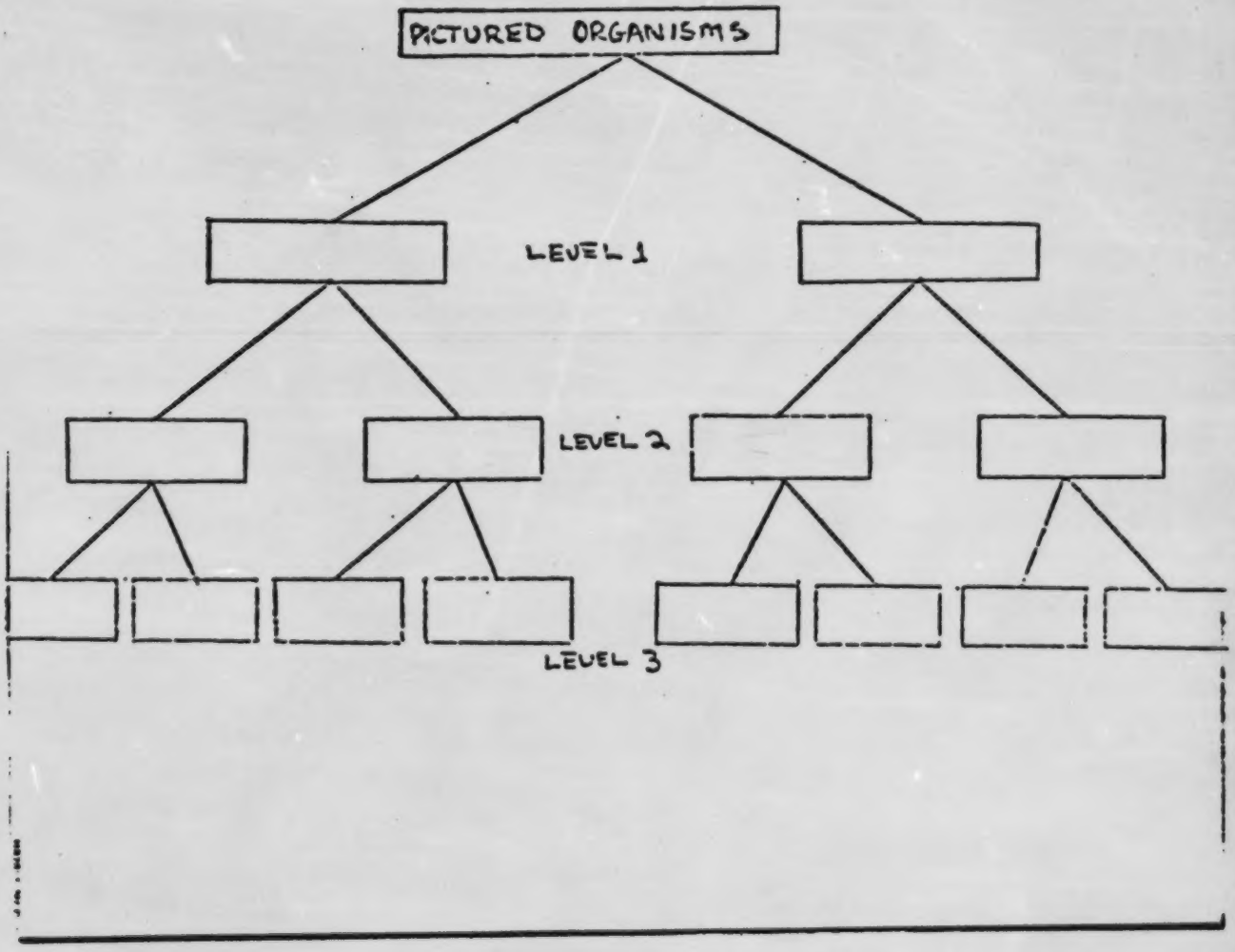

E


F

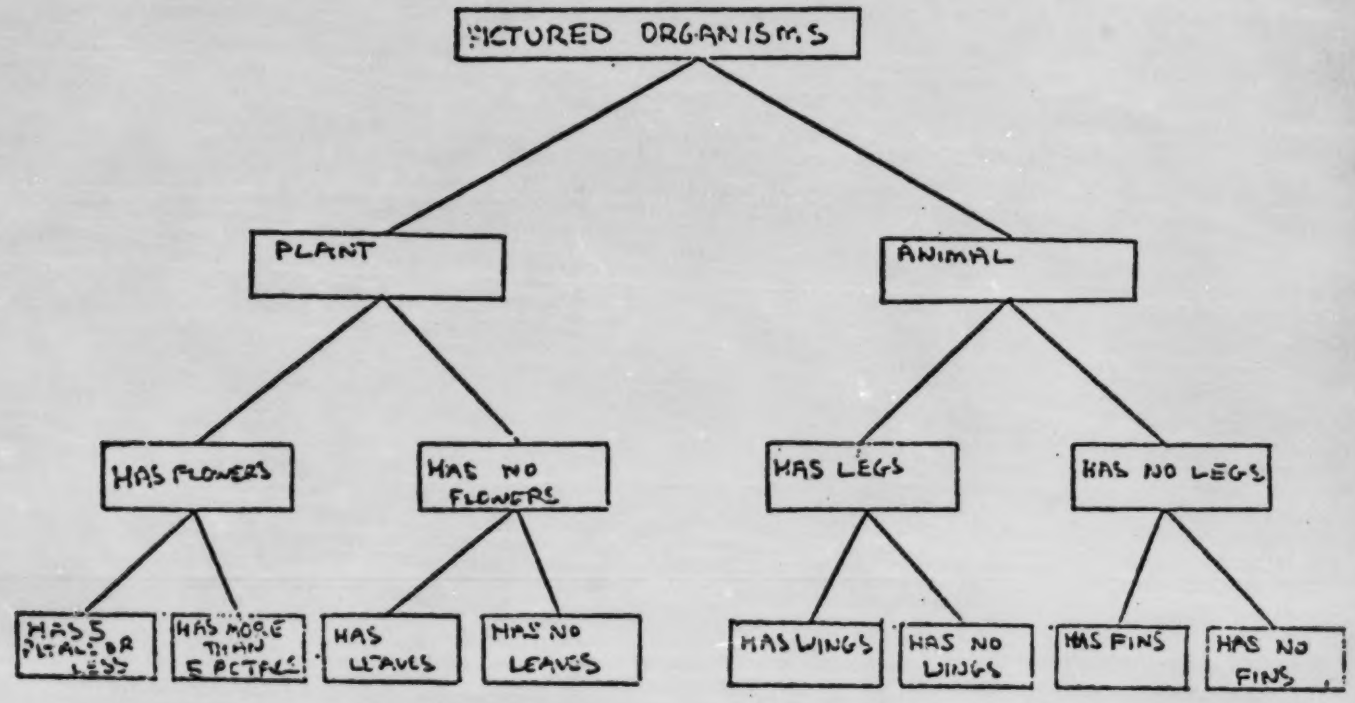
G

H

1. Make a classification tree using the classification chart provided below. The two groups in level 1 must obtain the same number or organisms. The four groups in level 2 must contain the same number of organisms. The eight groups in level 3 must contain the same number of organisms. State the characteristics of each group in the boxes provided.



ANSWER



2. Make a key for the pictured organisms.

Answer:

1. (a) Has animal characteristics----------2
   (b) Does not have animal characteristics----------5

2. (a) Has legs----------3
   (b) Does not have legs----------4

3. (a) Has wings----------G
   (b) Does not have wings ----------H

4. (a) Has fins----------E
   (b) Has no fins----------A

5. (a) Has flowers----------6
   (b) Has no flowers----------7

6. (a) Has 5 petals or less----------D
   (b) Has more than 5 petals----------C

7. (a) Has leaves----------B
   (b) Has no leaves----------F

This is one key for these pictures of organisms. There are others that students could produce. We suggest that this be marked by students exchanging keys and then checking the key by processing each organism.

3. The purpose of a classification key is to:
   (a) group organisms
   (b) make up a name for an organism
   (c) identify the name of an object
   (d) make a classification tree

4. A dichotomous key always gives you:
   (a) no choices
   (b) two choices
   (c) three choices
   (d) four choices

5. A dichotomous key of classification successfully eliminates the sorting choices by:
   (a) using alphabetical listings
   (b) deciding on an either/or basis whether an object possesses a characteristic or does not
   (c) asking new questions
   (d) all of these

Books generally available in school libraries.

General	
Asimov	A Choice of Catastrophes
Ford	In Jeopardy
	The Great International Disaster Book
Rasky	Great Canadian Disasters
Sobol	Disaster
Natural Disasters	
Bauer	Wonders of the Earth
Branley	The Earth: Planet Number Three
Brown	Earthquakes
Brown	Volcanoes
Bell	Thunderstorm
Brindze	Hurricanes: Monster Storms from the Sea
Jennings	The Killer Storms (Hurricanes, Typhoons & Tornados)
Navarra	Native Strikes Back
Ross	Storms and Man
Life Science Library	Weather
Gray	Men Against the Desert
Bauman	The Quest of Atlantis
Grant	Cities of Vesuvius
	The Frank Slide story

Plane Crashes, Shipwrecks	
Elder	And I Alone Survived
Hood	When Monsters Roamed the Skies
Rivera	A Special Kind of Courage
Read	Alive
Lord	A Night to Remember
Ronan	The Hindenburg is Burning
War & Civil Unrest	
Syme	Invaders and Invasions
Reeder	The Story of the First World War
Elson	Prelude to War
Shirer	The Rise and Fall of Adolf Hitler
Graff	The Story of World War II
	The Chilcotin War
Schull	Rebellion
Reiss	Upstairs Room
Frank	Diary of a Young Girl
Boom	The Hiding Place
Jackdaw	Winnipeg General Strike
Jackdaw	1837 McKenzie
Nuclear	
Stepp	The Story of Radioactivity
Nakamoto	My Japan 1930-1951
Hersey	Hiroshima
Outer Space	
Sullivan	Black Holes
Berger	Quasars, Pulsars and Black Holes in Space
Cohen	Creatures from U.F.O.'s
Kettlekamp	Investigating U.F.O.'s
Larson	Close Encounters: Factual Reports of U.F.O.'s
Gurney	Unidentified Flying Objects
Disease	
Gregg	Plague! The Shocking Story of a Dread Disease in America Today
Silverstein	Cancer
Rivera	A Special Kind of Courage
Jackdaw	Plague and Fire of London
Slavery	
Everett	The Slaves
Meltzer	Slavery
Starvation	
Helfman	This Hungry World
Hey	How Will We Feed the Hungry Millions
Pollution	
Bennett	The Pollution Guide
Fisher	The Overcrowded World
Roth	The Most Dangerous Animal
Jennings	The Shrinking Outdoors
McCoy	Saving Our Wildlife
Lauwerys	Man's Impact on Nature
Edelson	Poisons in the Air

MULTICULTURALISM

Garry Douglas

MAJOR THEMES

The major theme of this unit is the difficulties each separate group of immigrants faced when coming to Canada.

The series of television productions cover the years 1740 to 1927.

Questions that students are asked to answer throughout the unit are all based on Language Arts skills.

Very few questions in the unit can be answered by simply looking up a "fact". Instead the student is constantly asked for his opinion. The questions that require "factual" answers are mostly research questions designed to give historical background to the movie in question.

It is imperative that teachers recognize that any evaluation of this unit recognize that major themes are the writing, speaking, and research skills of the student.

TIME

This unit will take between 36 and 40 periods. Time is easily adjusted in this unit. The teacher may add or subtract activities freely.

SUBJECT AREAS

Social Studies

1. Canada - A Multicultural Society
2. Periods and Patterns of Migrations to Canada, 18th, 19th, 20th Centuries
3. Understanding the Dilemmas of Culture Groups on Questions of Assimilation and Identity

Language Arts

1. Applying Summarization Skills When Listening, Speaking, Reading, Writing, and Viewing
2. Summarization, Synthesization, and Evaluation Skills Must Be Effectively Combined and Applied in all Listening, Speaking, Reading, Writing and Viewing Tasks.
3. (not from official curriculum) Writing Paragraphs and Short Essays

RATIONALE

This unit deals mostly with the affective domain. Students really enjoy watching these films and over a period of time begin to realize that all people in Canada were once "newcomers". Teachers interested in dealing with prejudice will be pleased at how well the presentations show the ridiculousness of such an attitude.

The real reason for creating this unit was to show that social studies can be useful and structured without memorizing many dates and facts. Through self-expression (i.e. Language Arts) the students will be able to react to these films and in doing so will increase their knowledge. I believe that if a student is emotionally involved in something he remembers it very well.

Obviously, teachers who are skilled in the areas of Art will increase the number of assignments in the area and the same for poetry, speech making and any other language activity. The main idea is of course that students express their emotions. If the teacher makes sure that students take care in HOW they express their emotions by careful marking of assignments this unit should be rewarding.

INTENTS

Setting objectives when dealing with the affective domain often restricts ways in which students may react. The trouble with most social studies or language arts units written by teachers is that it is assumed other teachers using the units are not able to set their own objective.

Persons writing units often assume objectives are necessary, however, this is only a tradition and a restrictive way of thinking. To get the most out of this unit teachers must use it as a starting point. They must imprint their own style and objectives.

ACTIVITIES

Activity #1 Describing Emotions (student booklet pg. 143)
By comparing how they felt at the beginning of grade seven with how other newcomers to Canada feel - some empathy may be reached. (writing and presentation - 1 period).

Activity #2 Film"1740 The French"(student booklet pg. 143)
The goal of the film is to show that DeLugny develops character from his encounters with the new land. (2 periods).

Activity #3 Questions About Film"1740 The French"(student booklet pg.143)
The events in history which dominate this era.
An insight into the character of the players. (2 periods)

Activity #4 Emotions (student booklet pg. 143)
Recognize emotions in the actors
What causes the emotions?
Which emotions are strongest? Why? (1 period)

Activity #5 Art (student booklet pg. 143)
- injection of humour
- visualize details
- quality effort even if student is not an artist (up to 2 periods)

Activity #6 Paragraphs (student booklet pg. 144)
- teach structure of paragraph
- teach how to use imagination in the construction of paragraphs
- practice and evaluation make for better paragraphs (2 periods)

Activity #7 Library Research (student booklet pg. 144)
-What books on Canada are in the library? How big is the history section?
-What headings to look under.(½ period in class for library guidance. 1½ periods in library (minimum))

Activity #8 Essay (student booklet pg. 144)
Stress that an essay must express an opinion. An essay is not a report. (1 period)

Activity #9 Research Questions (student booklet pg. 144)
-to give an idea of the impact of the industrial revolution (2 or 3 periods)

Activity #10 Film "The Scots"(student booklet pg. 145)
-value of hard work
-what is the "work-ethic"? (2 periods)

Activity #11 Exercises on"The Scots"(student booklet pg. 145)
-developing vocabulary from watching T.V.
-describing characteristics of personality
-paragraph writing (1 period)

Activity #12 Art (student booklet pg. 145)
-setting your own life goals
-seeing yourself as others see you. (1 period)

Activity #13 Storytelling (student booklet pg.145)
A difficult exercise. Paragraphing a key skill! (1 or 2 periods)

Activity #14 Debates (student booklet pg. 145-149)
How can you study about emotions without expressing them? The physical setting for debating is very important. Insist on rules when debating. Encourage neatly written opening statements. You may wish to incorporate these statements into the student booklet. (3 periods)

Activity #15 Film "The Irish" (student booklet pg. 149)
The plot is confusing but the action enjoyable. It may help to discuss (briefly), during the film....just who is James' wife? ----who is the old woman at the beginning of the story? (2 periods)

Activity #16 Debates on"The Irish"(student booklet pg.149)
The ideas in these debates are central to the unit. Why be a newcomer ....? (at least 3 periods)

Activity #17 Word Meanings (student booklet pg. 149)
The words will help understanding about the film. You may wish to have reports done on cholera, Orangemen, etc. (1 period)

Activity #18 Paragraphs (student booklet pg. 149)
Making Inferences (1 period)

Activity #19 Film "The Ukrainians" (student booklet pg. 150)
Do you like Ivan Lypa? Discuss (2 periods).

Activity #20 Character Study (student booklet pg. 150)
Are first impressions the best? Are people "easy" to understand? Why? (1 period)

Activity #21 Story Endings (student booklet pg. 150)
Use imagination! Paragraphing a key skill. (1 period)

Activity #22 Film -"1911, Denmark"(student booklet pg. 150)
Do you like Camilla? Explain. (2 periods)

Activity #23 Questions on "Denmark" (student booklet pg. 150)
Comparing personalities. How are people alike? How are they different? Why? (2 periods)

Activity #24 "Voice of the Fugitive"(film) (student booklet pg. 150)
Slavery - is it immoral? Why? Are there other types of slavery that we take for granted today? Landlords? Discuss. (1 period)

Activity #25 "Strangers at the Door"(film) (student booklet pg. 150)
What are the strengths of the family as an institution? (1 period)

Activity #26 Opinions (student booklet pg. 150)
Take care here. Take time to carefully expand and discuss ideas on each question asked. (2-3 periods)

RESOURCES

1. Video tapes from Imperial Esso. (available at about $50 each - dubbed)
   (a) 1740 - New France
   (b) 1832 - Scottish Immigrants
   (c) 1847 - Irish Immigrants
   (d) 1911 - Immigrants from Denmark
   (e) 1927 - Immigrants From the Ukraine

2. Video tapes from ACCESS (dubbed)
   (a) "Voice of the Fugitive"
   (b) "Strangers at the Door"

3. At a higher price, Esso has 16mm films for purchase, but cost here may be prohibitive.

EVALUATION

Student Evaluation for Marks
Marks given can be based on one area or two depending on teacher preference.
a) Social Studies marks
b) Language Arts marks.

It should be noted that a major area of curriculum recommended by the Province of Alberta is the study of multiculturalism. The films seen in this unit have content very similar to the recommended texts in this area. (i.e. The Ukrainians and where they settled, where they came from, etc).

I found it convenient to give a mark for content and a mark for neatness and general "language-skills" for each exercise. I did not mark everything for every student as this slows the unit down too much. I suggest 10-15 minutes of marking in class a day or more.

Teacher Performance

One key to evaluating your performance in this unit is to be careful not to let it get "BOGGED" down. If need be leave out parts (or add new ones) in order to keep interest levels high. For example I found it convenient to do only a few practice debates.

How Good Is The Unit? What Classes Will Get The Most From It?

The unit will probably appeal most to well disciplined classes. Quiet and concentration are IMPERATIVE during the watching of the films. Do not repeat films unless really necessary in your opinion.

Students liked the unit each time I have done it. Perhaps one comment would be of interest. A student who did the unit (in a slightly different form) two years ago with me wanted to see the films again.....)

Students really watch a lot of T.V..... why not learn from it too?

A Final Note

It is important that the questions not be jumbled into one mass without giving spaces for answers. The way this unit is set up helps students be neater and more organized.

It is hoped teachers will not have students answer in notebooks and put questions on the board. The booklet provides ample room for teacher additions or deletions and looks better and neater than messy loose leaf pages.

(The student handbook has been shortened and is not set up as a student workbook.--- Editor's note.)

PLANTS - RATE, RATIO AND PERCENTAGE

Gary Lilley

MAJOR THEMES

The major themes covered by this unit, subject wise, are botany and mathematics; more specifically, plant anatomy/physiology and rate, ratio and percentage. An underlying theme would also have to be used in both subject areas' content to complement and better facilitate the teaching of the other. This integration is the basis for inderdisciplinary learning and teaching.

TIME

The unit as it stands runs over a 3-week period (at 5 periods math and 5 periods science) and can tend to stretch a little longer. Periods may be borrowed from math occasionally or rearranged in the time table as is convenient or possible to allow for work periods which may run longer than one period.

SUBJECT AREAS

A more specific breakdown of the subject areas involved in this unit are as follows:

Science

(a) Plant anatomy - including the root, stem, leaf, flower and seed
(b) Plant physiology - the basics of photosynthesis and respiration
- pollination, fertilization (sexual reproduction) and seed germination
- process of transpiration and gas exchange

Math

The Math Consortium 7 unit on Rate, Ratio and Percent is taken concurrently with applicable work based on statistical analysis of the plant growth being the prime objective. Graphing of ordered pairs in the form of a growth chart is also included.

Language Arts

Maintenance of basic skills as well as addition of vocabulary are stressed.

For a more specific analysis of subject area in terms of objectives and goals, see section titled Intents.

RATIONALE

There are many opportunities to develop ways in which different subject disciplines can be applied to each other. Many subject areas lend themselves to the development of units which stress how interrelated the subjects can be and indeed are. This emphasis shows that education does not consist of isolated learning disciplines such as science, math, language arts and social, but rather that all subjects are related and that no discipline is a definite entity.

The concept of interdisciplinary teaching is by no means new and is in fact practiced daily by practically all teachers (knowingly or not). This unit was developed to purposely use the interdisciplinary nature of the core subjects Math, Science, and, to a certain extent, Language Arts.

No two subjects lend themselves to interdisciplinary teaching better than Math and Science. Mathematical relationships are intrinsic to physics, chemistry and to a large extent biology. This unit uses statistical analysis (albeit simplistic) to examine the growth of plant specimens. Rate, ratio and percentage calculations are employed to study the physiology of plant growth as well as to provide concrete examples of how these calculations can be used in a practical sense. Far too often these types of calculations are left solely to the "supermarket type" examples and although these are valid as well as useful they are limited in that they do not expose the student to other areas where these calculations are used.

An important consideration is always motivation. This unit has a very high student interest factor in that they are working with their own plant (or group of plants) from the seed to adult stage. A lot of effort in both maintenance and monitoring the growth of the plant effectively "bonds" the student to the work and makes them attached to their plants. It also provides a good example of the type of work a horticulturalist or botanist might be engaged in. It illustrates quite well that the study of science, botany in particular, and mathematics do fit into everyday working society and do have value.

Visits to local government greenhouses or agricultural facilities further demonstrate that science does contribute to society's well-being in terms of increased crop germination, better growth as well as new varieties of useful plants. Obviously this is directly associated with social studies (geographical distribution of vegetation, agriculture, forestry industry, etc.) and could be very easily incorporated into that discipline. Of course, language arts is present in all subject areas, and the vocabulary associated with this unit could form the basis for many related activities.

INTENTS

Broad goals or major concepts which the unit attempts to fulfill are, as dictated by Program of Studies, Alberta Education:

Major Science Concepts

(a) Living things carry on certain fundamental processes to sustain and perpetuate life (life processes).
(b) All living things interact with and are inderdependent upon each other and their environment.

Science Skills, Associated Scientific Investigations

(a) Observation
(b) Quantifying measured data
(c) Identifying problems clearly so that variables may be controlled or manipulated
(d) Interpreting data; making inferences leading to hypothesis and predicting future behavior.

SPECIFIC OBJECTIVES

At the end of this unit the student should be able to show a good understanding of:

A. the anatomy and function of the plant (i.e. root, stem, leaf, flower and seed) and how these structures work together for growth and maintenance of the plant,

B. photosynthesis (how plants make their own food) and basic respiration (how they use the food to make energy),
limit - formula $6CO_2 + 6H_2O \xrightarrow[\text{chlorophyll}]{\text{sunlight}} C_6H_{12}O_6 + 6O_2$ and reverse

C. sexual reproduction in the plant including pollination, fertilization and germination.

Math

Specific performance objectives for the Rate, Ratio and Percent portion of the unit are (Jr. High Math Consortium):

1. Maintain previously developed skills and ideas: change fractions to an equivalent fraction whose denominator is 100.

2. Express rate, and ratio, in the form $\frac{a}{b}$ or (a:b)

3. Find the missing component in any rate or ratio expressed in the equivalence condition form eg. $(\frac{3}{5} = \frac{x}{20})$

4. Solve problems involving rates and ratio.
   (a) convert fractions to percent
   (b) convert percent to fractions
   (c) convert decimal to percent
   (d) convert percent to decimals
   (e) solve problems involving percent

5. Take a given set of ordered pairs (x, y) and graph them, limit 1st quadrant.

6. Measure accurately in SI units.

ACTIVITIES

The unit is divided into two separate sections: this first is a re-creation of Van Helmont's experiment which is the basis for the statistical analysis (rate, ratio, percentage and graphing) of the bean plant. This activity also provides the plants which will be further used in dissections. The second section is the actual plant anatomy portion in which investigations into the structure and function of the plant is the main theme.

The sections overlap at times in many periods (i.e. the two sections run concurrently for a time) but this proves to be no problem as the overlap is minimal. The first 5 minutes, or thereabouts, of each period is taken up measuring and observing the plants themselves. The remaining time is left for the anatomy-dissection portion.

Important Organizational Points

The mathematics portion Math Consortium 7 - Rate, Ratio and Percent should be started 1 - 3 periods prior to the plant unit. This gives the students some background knowledge into rate and ratio and makes the initial calculations run smoothly. Use all possibilities presented by the different measurements involved to develop rate, ratio and percentage questions.

I Since Van Helmont's experiment is the basis for such a large portion of the unit certain precautions should be taken to ensure a high percentage of plant germination and growth. It is also important to obtain accurate initial and final weight measurements of the soil and plants for Van Helmont's experiment. The following steps are recommended:

In order to obtain good germination, pre-soak new bean seeds for 24-48 hours prior to planting. It might be a good idea to start soaking the seeds on Wednesday and start the unit Friday with weighings and plantings. This way the readings can be taken on the seed sprouts which come up over the weekend. Start with dry soil, oven dry if necessary. Weighings & plantings require a double period. Also, set 5 or 6 seeds aside in a jar between moist blotter paper so that the class can observe what is happening to the seeds as they germinate.

Place the pots under a good light source. This can later be used to explain phototropism.

At the conclusion of the Van Helmont experiment (growth rate experiment) be sure to oven dry the soil before weighing for the final calculations.

II The unit follows a chronological order after Van Helmont's experiment. The sequence and notes of each lesson is as follows: the seed, root, stem, leaf (photosynthesis, respiration and transpiration included) and the flower (pollination, fertilization included). The seed, root and stem can easily be accommodated in two periods each (one for theory; one for lab) and perhaps less if students' home work is increased. Because the theory is more complicated in the leaf and flower lessons 3 periods should be allotted these. Microscopes are necessary in the stem and leaf lessons. Further considerations are:

1) Seed lesson: Obtain corn and bean seeds for dissection.
   lab Dissection kits for all dissections should consist of scalpel, forceps and a probe.
   Diagram may be drawn and marked as assignments.
   Math question - rate of germination, percent, etc.

2) Root lesson: Sacrifice one bean plant for root observation.
   lab Make sure there are enough carrots for dissection.

3) Stem lesson: Use 1 bean plant for stem dissection and be sure to have
   lab microscopes available for use. Slides should be made. Cross-section cuts reveal vascular bundles while thin longitudinal sections show xylem wall structures very well. Congo Red stain works well on these structures. Take the best slides (or make a good one yourself) and use a microprojector to show the structures. This is probably necessary as some students won't be able to make good enough slides.

Math questions -rate of stem growth per day, week, etc.

4) Leaf lesson: Try bean leaves for slides - epidermis can be removed fairly easily to show stomata. Use prepared slides on microprojector to show internal structures.

Math questions -Ratio stomata to leaf area, etc.

5) Flower lesson: Try to obtain flowers from a local florist as the beans will not have flowered by then. Most florists have old flowers which will be thrown out anyway. This will allow you to have a good sample of flower types (i.e. complete, incomplete flowers). Make sure you are familiar with the flower parts before the dissection begins.

Math questions - use pollination and fertilization examples as the basis for math questions (ex. one anther produces 10,000 pollen grains and only 4% reach the stigma. What is the rate of pollen transfer success? How many pollen grains of the 10,000 actually land on the stigma?)

6) Also provided in the student handout section are copies of review and vocabulary exercises as well as a final exam. All were used during the duration of the unit and proved to be interesting additions.

Additonal experiments/demonstrations

The following are given as supplemental activities which may be used in the appropriate sections of the unit. They are by no means complete but provide an excellent example to enhance the unit dissection and experiments.

1) Root section: starch tests on potato or corn to show storage of the products of photosynthesis

: taste tests also possible

2) Stem Section: use microprojector to show cross-section of stems and good longitudinal section of xylem and phloem

3) Leaf section: use microprojector to count stomata on top vs bottom of leaf

: use microprojector to show leaf cross-section

4) Models of leaves, stems, seeds and roots (3D) as available.

5) Photosynthesis in aquatic plants
   (a) a lab which tests for O_2 production by elodea or other aquatic plants when placed in sunlight.
   (b) Place elodea in test tubes of water - one in light one in the dark for 24 hours. Look for oxygen bubbles.
   (c) use geraniums, one in the light, one in the dark, At the end of the experiment, test the leaves for starch production.

6. Respiration (a) Bromothymol blue + water + elodea in a test tube with stopper, one in the light, one in the dark for 24 hours. Bromothymol blue turns yellow in the presence of CO_2.

(b) Related experiment using a human subject. Have a person exhale into limewater to show the presence of CO_2. (or bromothymol blue + water).

Culminating Activites

Field trips to government greenhouses, forestry stations (Alberta Pine Ridge Tree Nursery)or the Muttart Conservatory are highly recommended.

Math

As mentioned previously the math portion should be started early to allow the science unit to fit in smoothly. Many assignments in the Math Consortium book may be omitted and replaced by questions and examples arising from the science unit. The rate, ratio and percentage unit goes quickly and some periods may be used for science if necessary.

RESOURCES

Although a great amount of knowledge of plant anatomy and physiology is not necessary, the teacher should be familiar with the basics. Good resource readings for the teacher may be found in any High School biology texts.
e.g. Otto & Towel MODERN BIOLOGY, (Holt, Rinehart, Winston)

BSCS BIOLOGICAL SCIENCE - AN INQUIRY INTO LIFE, (Harcourt, Brace and World Inc.)

A. Fahn PLANT ANATOMY, (Pergamon)

R. M. Ray THE LIVING PLANT, (Holt, Rinehart, Winston)

Student texts are good student resources and should be used where possible. Since there are many accepted texts in circulation, the teacher should use that which is available at the school
e.g. Mason & Peters LIFE SCIENCE - A MODERN APPROACH, (ABC)

Brandwein, Stollberg, Greenstone, Yasso, Brovey LIFE -ITS FORMS AND CHANGES, (Harcourt, Brace, Javanovich)

Fitzpatrick, Hole MODERN LIFE SCIENCE, (Holt, Rinehart, Winston)

The Curriculum Resources Information Bank (C.R.I.B.), available in every Edmonton Junior High School, is an invaluable teacher resource for materials, experiments, test items and, to an extent, A.V. material. It was used in the preparation of this unit and as mentioned is an excellent resource. The following is a list of specific audio-visual materials which proved to be useful:

Filmstrips: Flowering Plants - Structure and Function
- Growth from Seeds
- Roots and Their Work
EPSB SS 254 - Leaves, Roots, Stems

EPSB Kt 907 - The Seed Plants
EPSB Kt 908 - The Seed Plants - Roots and Stems

EPSB Kt 909 - The Seed Plants - Flowering Structures
EPSB Kt 910 - The Seed Plants

EPSB MP 761 - Secrets of the Plant World
EPSB MP 451 - Photosynthesis and Respiration Cycle

3D Models of Leaves, Roots, Stems, Seeds

EVALUATION

Student reaction to the unit was very positive. High interest throughout the unit was due, to a large extent, to the growing and maintenance of the plants and the dissections of them as the unit progressed. The students provided positive feedback to the integration of the math into the study of the plants. Many enjoyed "doing math in science" much more than in a regular math period.

Student evaluation was in the form of written short answer tests, examples provided in the unit, as well in work habits and procedures throughout the duration of the unit. All work was marked for language arts content (i.e. written skills, spelling and vocabulary).

Possible Improvement

The unit tends to run a little long. Many parts may, at the discretion of the teacher, be omitted or lightly touched. Areas which may have been previously taken during the year may be covered in this unit and these are the areas which may be omitted or reviewed.

Field trips both prior to the unit and after provide good motivational and enjoyable activities to add diversity and continuity to the instructional assignments. These will break up the routine of daily measurement, calculation and dissection and add to student enjoyment (this was not a problem, however). It must be stressed that a daily routine of measurement and maintenance should be developed by the students.

Teacher Reaction

I was very impressed by the students' reaction, enjoyment and fulfillment of the unit. Interest remained high and the quality of work produced was impressive. A strong point of the unit is its ability to keep the students manually busy, that is, maintaining, charting growth and dissecting their plant while learning the theory of its physiology and anatomy. It also provides many "entry" points for other subjects, social studies in particular, as previously mentioned, and language arts in general. All in all, a unit which works quite well and one which I will definitely use again.

REFERENCES

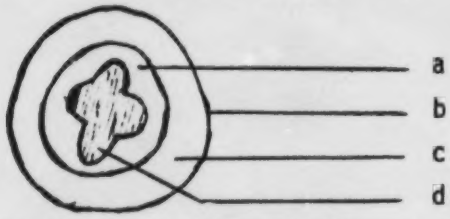
1. Jr. High School Math Consortium Level Seven
   Edmonton School District No. 7, 1976

2. Portions of the Science Unit were developed from C.R.I.B.
   (Curriculum Resources Information Bank) Edmonton Public School Board.

Plants Exam - Grade 7

2) 1. What does a plant do that animals can not?

4) 2. Label this root cross-secton.



4) 3. Give the functions for the above structures.
a)
b)
c)
d)

3) 4. Name the steps in seed germination.

1) 5. Your class planted 28 seeds, only 12 did not germinate. What percentage of the seeds germinated?

7) 6. Describe phloem and xylem. Where are they found?

1) 7. Where does absorption of water take place?

2) 8. In what parts of the leaf does photosynthesis take place?

3) 9. Draw and label a stomata. What does it do?

2) 10. When does respiration take place?

2) 11. What two things are necessary for photosynthesis to take place?

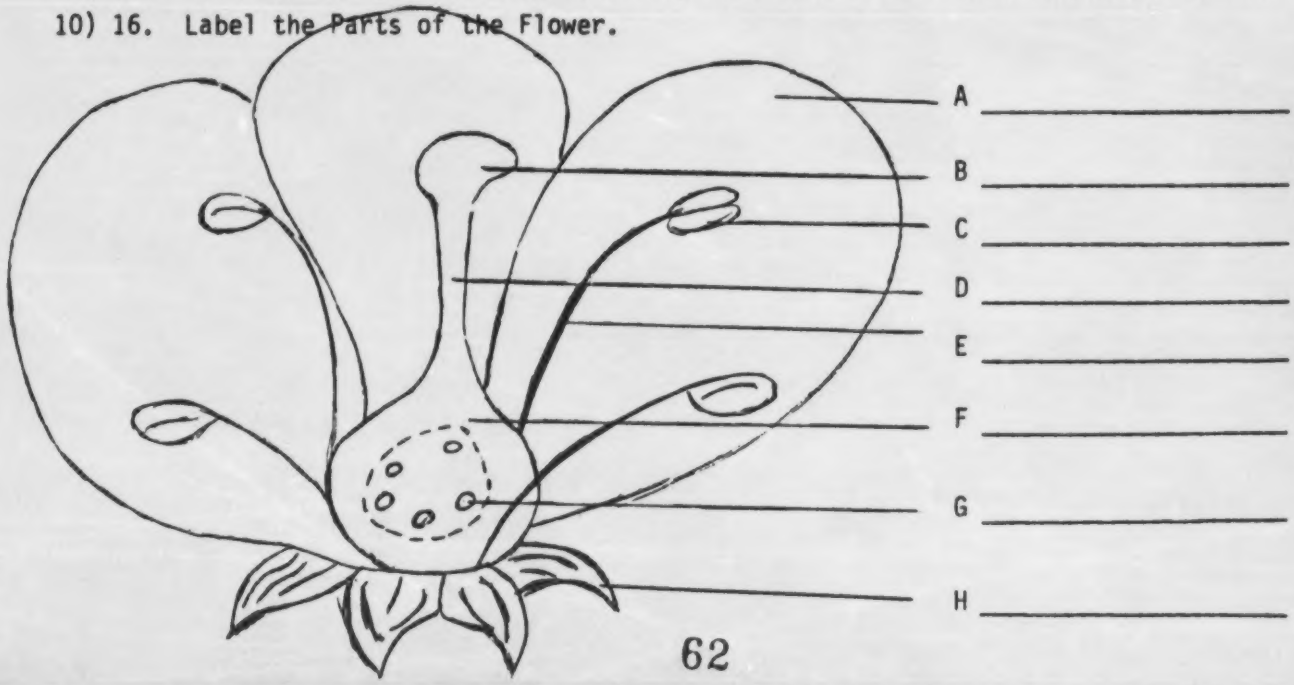
2) 12. What is produced by photosynthesis?

2) 13. Where does respiration take place and why is it important?

2) 14. What two things does a plant need as raw materials to make its own food?

2) 15. Name two things which are necessary in order for a flower to produce seeds.

10) 16. Label the Parts of the Flower.



16. (continued)
Parts A, B, and C make up the _____ .
Parts E and F make up the _____ .

1) 17. What is meant by sexual reproduction in the flower?

1) 18. Why are there two sperm cell nuclei in the pollen grain?

2) 19. How is cross-pollination different from self-pollination?

7) 20. Draw and label a plant cell.

60) Marks Total

LIBRARY RESEARCH REPORTING SKILLS Ed. E. Simbalist

MAJOR THEMES

The research report unit deals with three main areas of concern which should be pursued as an integrated series of lessons if the maximum results are to be achieved:

(1) Library organization and the use of library resources.

(2) Report format and organization.

(3) Subject orientation: report topic and subject objectives.

The first two elements should be regarded as facilitating the over-all objective set by the subject teacher. Activities in the unit can be classified into one or another of these themes, but their over-all relation to the subject objectives should not be obscured.

TIME

If pursued as an integrated, interdisciplinary unit by the subject teacher and the language arts teacher, the report unit should require about three weeks, with an average of nine or ten 40-minute periods per week shared between the teaching assignments of both instructors with the class.

If pursued solely by the subject teacher, the time required to cover each thematic component of the report unit will be:

(1) Library Skills: about 10-12 periods

(2) Report Topic and Research Time: about 8-10 periods

(3) Report Format and Organization: about 10 periods.

SUBJECT AREAS

Integration of Interdisciplinary Goals

The interdisciplinary approach offers an opportunity for all teachers concerned with the development of student skills in research reporting to have input into the activity, while the student benefits by learning relatively early in his school career to do the job properly.

The unit chosen for one report in the project was the cultural practices of the Plains Indians. Let us consider the specific goals that each discipline will regard as important.

Social Studies

The subject teacher will be most interested in those elements bearing on the subject matter itself. The following topical areas were thus distinguished for the students' attention:

(a) The nature of the country in which the Plains Tribes lived
(b) Hunting procedures and weapons
(c) Foods

(d) Dress and ornaments
(e) Dwellings and furnishings
(f) Transportation: with special emphasis on the role of the horse
(g) Social/Political organization
(h) Warfare
(i) Social life
(j) Games
(k) Music
(l) Art
(m) Literature (Indian Legends)
(n) Religious beliefs and practices
(o) Effects of contact with the White Man--leading to Indian life today

The scope of the assignment will, of course, determine exactly how such topical areas are going to be handled. In other words, the principle objective(s) of the actual subject report should be clearly delineated by the subject teacher. In an interdisciplinary situation, these objectives will inform and guide the language arts teacher and the librarian in their presentations, so that they will consciously and deliberately reinforce the basic objectives which form the raison d'être of the specific report assignment.

Language Arts

The language teacher will be most interested in those elements bearing on the effective presentation of the subject matter--communication skills. Objectives are to develop correct procedures for:

(a) Delineation of a specific topic ("limiting the topic") so that it can be handled in the 500 or so words assigned
(b) Organization of materials into a coherent arrangement
(c) Paragraphing
(d) Sentence structure and proper punctuation
(e) Spelling
(f) Essay format
(g) Bibliography format

Librarian

The Librarian will be most interested in those elements bearing on the effective use of library resources:

(a) Library organization
(b) Use of the Card Catalogue and Vertical File
(c) Use of the encyclopedia
(d) Periodicals: how to find and use articles
(e) Reference works
(f) Filmstrips and other resources

All instructors will be interested in promoting the effective gathering and general evaluation of data obtained. Introduction to the "card" system of taking notes, for example, or encouraging students to avoid massive direct quotation of research sources are matters to be constantly stressed. In fact, all aspects of the report have a direct bearing on student success or failure.

RATIONALE

By the time a student reaches Grade 7, he will likely have only rudimentary skills in the area of researching and reporting on a topic which might be assigned for investigation in any subject area. "Research" to many students is little more than looking in an encyclopedia or a single reference work, while "reporting" is often the mere copying down of information verbatim. Such activities are not reporting by any stretch of the imagination. Indeed, encouragement of such procedures is plain bad policy and will grievously impede the ability of a student to ever comprehend the nature of proper research and report procedures.

Instructors should realize that the Language Arts curriculum does not lay much stress on developing extensive writing skills until Grade 9, when the essay is taught as a formal writing style. There are some language teachers who do instruct their students on essay writing before Grade 9, but one should not count on that happening in the lower grades. Grade 7 students, for instance, will concentrate largely on learning how to write proper sentences and single paragraphs. Rarely will much attention be given to the integration of five, six, or seven paragraphs, or more, into a coherent essay.

Instructors should also realize that the ability to use a library as a research tool is, again, not taught extensively or at all in lower grades. Yet it is assumed that students can make effective use of library resources, just as it is assumed they can write 500 to 1000-word research essays.

INTENTS

By the time a student reaches Grade 7, he will likely be required to write some form of research report in subjects like social studies or science. There are many advantages to such an activity:

(1) Reporting allows students to discover areas of knowledge for themselves.

(2) Reporting involves the development of essential interpretive skills which promote general understandings of a subject area far beyond the topic of any given report.

(3) Reporting permits students to present information to each other if oral presentations are part of the assignment, thereby eliminating the standard one-way teacher to student process and at the same time cultivating student confidence in their abilities to "hold forth" at length on a topic.

(4) Student interest in a subject can be raised significantly when they become involved in a topic in some depth.

We could go on at length, but the value of reporting is surely clear. Yet, if the importance of research reporting is acknowledged, the problems involved with such an activity are often obscured.

Vital to the realization of these broad objectives is the development of student awareness of the process by which a report can be written easily and effectively. He must be shown a patterned approach, step by step, which can serve as a guide to all research report activities. At the conclusion of the

unit, the student ought to have some idea of the procedures to follow when given any assignment requiring research into the subject. This will prevent the "freeze" phenomenon, the inactivity which some students fall into because they "do not know what to do." It will also develop an efficient procedure for the better writers and researchers, who will otherwise waste time in ineffective (if energetic) searching for information or in the composition of the actual report.

ACTIVITIES

The Interdisciplinary Approach to Report Writing

Clearly, the instructor of a social studies or science course will be operating at a considerable disadvantage if he desires his students to write reports. It is easy to assign a report topic; whether or not the students can effectively handle the work is another matter. The problem is clearly interdisciplinary. If a student is going to be able to present his findings in an acceptable and worthwhile form, he must be able to apply skills properly belonging to the Language Arts area. This has several important implications:

1. The instructor of social studies or science must be prepared to enter into partnership with a language teacher to jointly develop research reporting skills. Failure to understand that a "watered down" approach to reporting which minimizes essentials like spelling, punctuation, syntax, paragraphing, etc., will result in the development of bad and sometimes uncorrectable student habits which will impair later development of good writing procedures. It will also foster a belief on the part of some students that "good English" is not essential in other subjects. If the social studies or science teacher feels that he is unqualified to teach such matters, or that he does not have the class time to do so, it would be wise to approach the language teacher of his class for assistance in the project.

2. If, for some reason, a joint effort on the part of the subject teacher and the language teacher is not possible, the instructor must be prepared to teach the essentials of good reports writing to his students, in addition to concentrating on matters belonging purely to his own subject area. To fail in this is to ignore the fact that the students must learn such skills from someone. If reports are demanded, the duty is clearly on the teacher who required the reports to ensure that the students know how to perform the task.

3. The skills of the school librarian must be enlisted. This unit is, itself, in part the product of the efforts of Mrs. Heather Etsell, the librarian at Edith Rogers Junior High School. Recognizing that the students coming into her library did not comprehend how to use its resources effectively, she developed an introductory program to introduce Grade Sevens to the library. This program, along with lessons on report format, we jointly developed into our project research unit. Teachers are therefore wise to sit down with the school librarian to plan out a reporting assignment. The resources of the library can be quickly assessed, deficiencies might be made up by drawing on the resources of other areas which the librarian knows about, and the librarian herself may be utilized as an instructor/resource person while the students are in the library researching their topics. Co-ordination of effort pays huge dividends.

The interdisciplinary approach recognizes that there is more than one instructor whose skills may be used to produce an effective reporting project. The subject teacher becomes the co-ordinator of the project. The language teacher can aid in establishing satisfactory standards in writing, and hopefully will devote some instructional time in Language Arts to develop specific writing skills to make the form of the reports academically acceptable. Indeed, joint-marking of the final copies can be one of the goals of the instructors. The school librarian can aid in facilitating the research activities, ensuring that materials are available and that students learn how to find them efficiently. She can also assist in such matters as arranging field trips to the public library, museums, or other resource centers which she knows will have materials of use to students.

The following student handbook provides a collection of teaching materials and activities which will reinforce the many skills which students must develop if the reporting exercise is going to have any lasting value. They divide into two general categories. The first series of lessons involves procedures which enable students to gather report materials while the second series involves procedures needed to write the final report to be handed in for grading.

*The Nature of a Research Report

A general reading to serve as an introduction to the process of proper reporting. The Instructor should stress the importance of starting out with the right idea of what the whole activity is attempting to accomplish. About one period may be devoted to the reading and discussion.

Choosing the Topic

Once the general purpose of reporting is clear, the range of topics available for the report can be set out. This can be accomplished by the subject teacher in about one period, although student choices should generally not be insisted upon immediately. Give several days for a commitment to form. Simultaneously, brainstorming activities can be taught either by the subject teacher or by the language teacher, if a joint-effort is ongoing. Brainstorming teaches students to "open up" their thought processes so that possible avenues of approach can be discovered. It should be noted that students often do not have a "clue" about what to do with a topic once they have chosen it. Ideas that grow out of a brainstorming session often get them moving quickly once they reach the library. One or two periods can be spent on brainstorming.

The Purpose and Proper Use of Encyclopedias

Although it can be taught initially in the classroom, use of encyclopedias is best presented in a library setting. The many kinds of encyclopedias can be pointed out, followed by a presentation of the index system used in most encyclopedias. About one period is required for most classes.

Narrowing the Topic

By this time, the students have probably selected the topics for their reports, and are eager to get on with it. The time to rein in tightly has arrived, for they are unready as yet. Narrowing the topic is a lesson designed to show them how to take a large subject area and squeeze their attention down to a manageable

*The following underlined paragraph headings refer to the "Student Handbooks" in Appendix A - under Library Research Reporting Skills.

focus. Use the Exercise (p. 180) to teach the procedure of moving from the general to the specific by asking a specific question or making a specific statement about the topic, then dealing with it in the report "answer." The final stage is the narrowing of the selected report topic. About one period is required by most classes.

The Dewey Decimal System

As the first in a series of lessons about the library and its organization, the introduction of the Dewey system is essential and is best conducted by the school librarian. The three exercises (pp. 182 and 183) and the lesson require about a period to two periods in a library setting.

The Library Card Catalogue

Once the students have been briefed on the Dewey Decimal system introduction to the library cataloguing system will be generally understood by most students. Some will already be acquainted with the procedure, but it is safe to assume that at least half will be quite unaccustomed to using the card catalogue at all. Again, the librarian should conduct the class, finishing with the "search" exercise outlined at the end of the lesson. About one period is required.

The Readers Guide to Periodical Literature

This lesson is optional, as not every teacher will require the use of periodical articles for reports. However, if it is decided that the skill will be useful, the librarian can conduct the lesson in about one period. The librarian might also decide to introduce the students to the range of periodicals available in the library at that time, especially those of use for the subject for which the report is to be written, noting special features of the most significant periodicals.

Choosing Books for Research

This lesson can be taught either by the librarian or by the language teacher. It is a general introduction to the book itself. Many students are quite unaware of how to find out what is contained in a book from the table of contents, the index, and the "blurb" on the dust jacket. Up to one period may be devoted to the lesson.

Skimming Books for Information

The language teacher can easily spend two or three periods on Lesson Eight, using the abstracted chapter "Assault on Our Ears" (pp. 191 to 197) as a demonstration source. The ability to cover ground quickly and yet efficiently is essential to good report writing. Skimming should not, therefore, be regarded as an activity which can be passed over lightly.

Taking Notes

Immediately following the skimming lessons, the students should be introduced to the proper procedures for taking notes with 3" x 5" note cards. The method should be insisted upon as part of the report to compel reluctant students to do it. Note cards effectively short-circuit the tendency of many students to copy down (plagiarize) their sources word for word. They also make easy organization of information possible without re-writing and re-writing (which many students refuse to do, resulting in badly organized reports). Again, the language teacher may conduct the lesson, which might require several classes.

The article "Assault on Our Ears" can be used as a demonstration material on which to base the note-taking exercise, with students "summarizing" in point form the essential information in relevant paragraphs. Use the question, "Does noise cause damage to our health?" as the topic narrowing question.

Organizing Notes

Again, the language teacher could present the lesson on how to organize one's note cards so that a coherent pattern of information develops. About one period is required. Page 199 contains 21 sample note-cards which can be used in the demonstration. Students have to decide which information goes where. If the cards are reproduced in a large enough size to be seen all over the classroom, they can be mounted on a tackboard, etc., in the categories suggested by students, then discussed for appropriateness. They can even be arranged in the exact order in which they would be used in writing several paragraphs on the subject. The advantages of using note cards should then become apparent.

Researching the Report

At this stage, the students are ready to begin their library research. They should be provided with 3" x5" note cards (at least 50 per pupil). The first stage should be to read one or two encyclopedia articles to acquire a general overview of the topic area, then in depth research through use of the card catalogue and periodical guide to locate specific books and articles on the chosen subject. All notes should be taken on the cards in point form. From four to eight periods can be devoted to the research aspect, depending on the length and nature of the topics assigned. The lessons can be supervised by the subject teacher and the librarian, who will find that their attention to student problems will be constantly occupied.

This aspect of the report can be compromised if insufficient materials are available for all the students to use at the same time. Several procedures should be instituted to ensure availability of books. First, overnight loans should be imposed on all resources required for the report project. Second, if insufficient materials are available in the school library, temporary loans from other schools might be arranged and/or field trips to the public library should be organized either during or after school hours. Third, before the report project is started, consultation with the librarian about available materials should yeild a range of topics so that there will be enough materials if students are diverted into a number of different topics that do not overlap. The social report on the Plains Indians outlined above, for example, is only a partial list of topics and sub-topics. Other report subjects assigned at the same time included Explorers of Western Canada, the N.W.M.P., Fur-Trading, The Western Pioneers, etc. That way, no student was deprived of materials.

Essay Format

A whole series of lessons are provided for the development of a proper form of the essay research report. If a subject teacher is unassisted by a language teacher in his reporting project, the amount of time that can be devoted to the many aspects of correct format will be limited. It might be that only a period or two can be spent explaining the requirements, with the hope that the students will read the provided materials themselves and follow the instructions given. The best course is to have the language teacher agree to instruct the students simultaneously with the research gathering activity, so

that they are learning how to write the finished report in their language class even as they are obtaining data in their science or social periods in the library. The methods are classic Language Arts procedures, and teaching methods should need no elaboration here if a language teacher is conducting the lessons.

The problem might well be that the subject teacher is thrown on his own resources. In such a case, he should at least consult with the language teacher on how to go about instructing his students on correct format. If at all possible, the language teacher should be talked into handling the problem, as it is a language arts area of concern and the language teacher should be interested in promoting such skills. If language curriculum requirements in the school are interfering with interdisciplinary co-operation between subject and language teachers, a meeting with the language department head is clearly in order to ensure co-ordination of efforts. Rigid separation of disciplines is unjustifiable, in the long run, and the language department should co-operate with other subject areas which are trying to promote the use of correct procedures in written assignments. If departmental policies do not encourage co-operative effort, it is perhaps time that the policies be seriously reviewed and the appropriate changes made.

RESOURCES

The resources required for the teaching of an interdisciplinary research report unit are:

(1) The unit handbook, complete with exercises.
(2) A school library and librarian prepared to teach the classes.
(3) Adequate texts and magazine articles to provide each student with at least three to five sources for his report. Some planning out of topics with the librarian is advised so that she can marshall the resources of the library to meet teacher requirements. Also, placing all designated resources on a 24-hour loan is suggested if one wishes to ensure that each student will have sufficient materials for home work.

EVALUATION

Evaluation of the unit will be discussed from two perspectives:

Student Evaluation

A wide range of evaluation instruments are available to determine levels of student understanding and proficiency in the various skills developed during the course of the unit, culminating in the grading of the completed report itself:

(1) Exercises may be taken in and examined--even graded. Grading of any work required from the students seems to ensure greater diligence and effort on their part.

(2) Short quizzes may be given on some of the areas covered. The nature of such quizzes will depend upon the degree of interdisciplinary teaching occurring.

(3) If conducted co-operatively with a language arts teacher, language assignments could be made to incorporate certain of the format requirements required in the research report, with part of the mark being determined by adherence to the format rules. This reinforces student attention to format in the larger report.

(4) The report itself should be graded on an interdisciplinary basis by the subject teacher and the language arts teacher. A recommended mix is 2/3 for content and 1/3 for language/format by the subject teacher, and 1/3 content and 2/3 for language format by the language arts teacher. The result is a joint mark in both subjects. Mechanics can be graded by the language teacher, while subject competence can be graded by the subject teacher. In addition to the mark assigned to the report itself, the grade for the unit would also include marks for the various exercises assigned and for the set of note cards which the student developed during his research.

The result of such an evaluation procedure can be a set of as many as 20 marks. They serve the particular function of giving an "instant" overview of the strengths and weaknesses of students in the various skill areas, allowing for later remediation.

Unit Evaluation

My personal experience with the unit demonstrated to me that an interdisciplinary unit of this type reinforced student awareness of the place of correct and considered language use in social studies. Once the basic format was established, for example, the students were subsequently required to follow it in even short paragraph assignments. By the end of the school term, many were able to deliver in a two hour period a coherent, organized four-to-seven page detailed discussion of the Plains Indians in a test situation. They were alerted one week earlier to the test date, and they studied. The test question was simply, "Tell all you know about the Plains Indians." No student discussed less than six of the topics on page (i), above, nor wrote less than two paragraphs on any topic. Even poor writers were able to struggle through with a coherent presentation of facts and explanations.

What was apparent in their performance was (1) organization of ideas along topical lines; (2) organization of ideas according to some order of significance which developed each topic; (3) rigid separation of facts and explanations so that no irrelevancies were introduced under any topic heading; (4) immediate response to even a general question like that posed by the test, with (5) narrowing of the general topic into specific sub-topics which could be discussed readily and coherently.

I attribute this student performance on a written test to two factors. First, the basic skills developed in the unit enabled most to organize their thoughts and writing efforts. Reinforcement of those skills was necessary in other activities, of course, as one report project will not suffice. Second, I had the two classes for both language arts and social studies. In effect, I taught an interdisciplinary year, merging language and social in many instances to reinforce skills and understandings in both subjects at the same time. While the results seem a bit too "hopeful" (a "halo" effect may have been operating because the group was part of a special grade seven project in our school), I do believe that joint-ventures in interdisciplinary teaching will yield higher performance levels than the present separation of disciplines.

Interdisciplinary approaches to reporting will hopefully throw the subject teacher together with the language arts teacher and the librarian on a more regular basis than has been previously the case in most schools. "Language across the curriculum" is a clear goal of the educational authorities in our school division, and report writing assignments provide the first and most obvious cross-over. By ensuring the co-operation and involvement of the language instructor in a report project, a subject teacher can help make it clear to students that good English is a must in his subject too. Reports will be in a neat, readable format that shows the student's knowledge, understandings, and efforts to best advantage to him--not to mention making the instructor's own problems with grading much easier. Even at the Grade Seven level, students will be encouraged to strive for a high standard of performance which will serve them well in later years. Proficient students will benefit greatly; while even the poor students will have a definite procedure and format to follow, eliminating those numerous wasted periods in which nothing is done because the student does not know what to do or how to do it.

Once a reporting technique has been established, the principles of good writing can be applied to other areas as well. Field trips can be made the subject of a written assessment and report by the student--whether it is a paragraph or a short essay. If he knows he will be expected to report on what he has seen and learned, one would hope he will be more attentive during the field trip. Similarly, even short assignments can be subjected to the same rigor. Lab reporting formats, for example, can be set in the same fashion as the essay format has been outlined in this unit. Definite procedures can be laid out which ease the student's task and make the result worth grading.

Joint-projects can also be established between subject teachers and the language instructor, in which content is marked by the subject teacher, while language usage, etc. is graded by the language teacher. At the end of this unit is a bibliography of readings on the subject of the Canadian West which would be appropriate for book reporting in language arts. Thus the social studies report could have direct ramifications for a reading program as well. A field trip to a museum would have applications for language as well as social studies, with oral and written exercises and assignemnts, readings, and discussions arising in the language arts class which have direct bearing on what the students are learning in social studies. Such opportunities for cross-overs between the disciplines are as numerous as the imaginations of the instructors, and as readily applicable as their willingness to work together to reinforce each other's efforts in their own disciplines.

WHEAT FARMING IN WESTERN CANADA Marilyn Webber

MAJOR THEMES

1. Farming History
2. Wheat History in Canada
3. Wheat as one of our Staple Foods
4. Wheat Economy

Each of these areas could be dealt with in about five 40-minute classes. All of these areas called upon specific skills of the Language Arts program as well as other curricular fields.

TIME

A general outline of the activities done in these four main areas follows. The activities listed were the ones that I attempted. Most of these activities take one 40-minute period.

Farming History

(a) oral review of general geographical features of farm areas
(b) film: "The Agricultural Revolution." Students will make notes on the film. Discuss topics listed in the Handbook (#10)
(c) Read pp. 2,3,4, and 10 in "From Wheat to Flour". Make notes.
(d) timeline of transfer from a hunting and gathering society to a technological society.

Wheat History in Canada

(a) field trip to Ft. Edmonton - activity day (#11 in Handbook)
(b) students bring samples of grain, newspaper articles, pictures of farm machinery, land-for-sale listings showing general costs of land in the Edmonton area, labels of wheat by-products.
(c) guest lecture - listening skills, questions prepared for interview, note taking, paragraph assignment
(d) build upon Vocabulary list - used for spelling tests
(e) read pp 8, 9, 10, 11, 12, 13 in 'Students' Story of Wheat"
(f) chronology of Canadian agriculture. Read pp. 7-10 'Students' Story of Wheat' (see Activity Sheet #8 in Handbook)

Wheat As One of Our Staple Foods

(a) read pp. 10, 16, 17, 46-47 "From Wheat to Flour" (#12 in Handbook)
(b) read pp. 5, 27, 28, 29 "Students' Story of Wheat" (#13 in Handbook)
(c) group work constructing charts showing parts of kernel, etc.
(d) library research on report topics
(e) film: Agriculture Canada - discussion topics in Handbook
(f) EPSB kit on "The Farm" - question sheet on machines
(g) cooking bannock and molasses candy for parents (#9 in Handbook)

Wheat Economy

This section could be deleted if you found yourself running short of time or if you had lower ability students.

(a) read pp. 2, 3, 7, 14-17, 20-23, "Students' Story of Wheat"
(b) read pp. 19, 20 "From Wheat to Flour"
(c) construct charts showing international wheat trade, wheat-producing countries, etc.
(d) group discussions
(e) oral reports

SUBJECT AREAS

Social Studies

Farming is the oldest industry. Various activities are as follows:

(a) notes on the transfer of man from a hunting and gathering society to a technological society
(b) timeline on the establishment of early cities and trade societies
(c) chronology of farming in Canada - (i) technological development (ii) biological improvement of wheat plant - speculation on the future of farming
(d) group discussions on topics like over-population and pollution
Vegetation of an area is determined by the geography
(e) soil types
(f) climate on the Plains
charts and maps

Science

The Wheat Plant (and other grains). Various activities are as follows:

(a) diagrams of the wheat plant (parts and their functions)
(b) notes on the nutrients of the plant
(c) notes on the use of fertilizer
(d) different machines with different functions in cultivation (notes and diagrams)
(e) listing of diseases and pests that attack the wheat plant
(f) collection of by-product labels
(g) study of wheat classification

Math

Chart of wheat production of various countries. Various activities are as follows:

(a) interpretation of chart statistics
(b) metric conversions (optional)

Language Arts

Various activities are as follows:

(a) Vocabulary - using terminology
- spelling
(b) Note taking - films, lectures
- "How To" paragraphs
(c) Research skills - using magazines, encylopedias
(d) Oral reports

Others
Pioneer cooking - serving a pioneer meal to parents or class.
Leather tooling samples

Bulletin board - newspaper articles, Fort Edmonton scene, maps, processing charts.

Field trip - participating in farm chores.

RATIONALE

"Students should devise a framework for culture study through a comprehensive analysis of our own cultural context as members of a dynamic technological society."

The Alberta Department of Education has given us this as one of the main objectives of the Grade Seven Social Studies program. I have tried to apply the following unit to this objective. It further gives 25% of class time to work on these units of personal interest. Farming has its own basic type of culture patterns, even though they are constantly changing with technological advances. I have tried to show how farm work has been done both manually and mechanically over the centuries. Hopefully, the students will realize what a complex industry it is and appreciate the many benefits they receive from this industry. It is hoped that the students had more regard for the historical significance of farming when they have finished this unit on farming.

For the introductory unit in the year, I use EPSB Social Studies unit entitled Canada: A Physical Geography. This deals with Canada's Seven Geographical regions and information was classified according to the following headings:

a) landforms
b) major water bodies
c) soils
d) wildlife
e) minerals
f) vegetation
g) climate

The last section of this geography unit deals with man's adaptation to a specific physical environment. Instead of doing a simulation of each of the seven regions, a class could concentrate on the Great Central Plains and carry out the activities of this interdisciplinary unit. Although I use this unit as the second unit, it could be used as an introduction to the year - using a farm culture as a basis to the study of culture.

This year 1980, being Alberta's seventy-fifth birthday lent itself to a general interest in the history of our province. The entire school worked on various projects all of which were displayed in our school gymnasium for parents one evening. With all the Social Studies classes contributing something there was keen interest and a sense of competition among the students.

The activities outlined seem to be very similar to the "enterprise system". Our timetable accommodated field trips and many other half-day activities. When students were organized and eager to work on a particular area, we could use an entire block of time to finish that activity. (This was great preparing for open-house, showing films and having guest speakers.)

The subject of farming becomes important, or at least real, when the student is immersed into the topic for a time period. Like so much of our daily lives nowadays, everything is inter-related. So it is with the wheat industry - intricately inter-related to all aspects of our lives in Alberta.

INTENTS

To show the historical aspect of farming.
To understand a fundamental Canadian industry in its most complete way.
To show the interdependence between all industries in our modern democracy.
To predict the future role of agriculture in our modern world.

Most of the objectives in the following list are geared to the Social Studies program. Teachers can emphasize any of the curricular areas that they may wish to use. This will depend on the training and expertise of the teacher as well as the resources that can be found in the school or the community.

Value Objectives

Students should develop personal growth in the following areas:

1. relate to and appreciate the history of farming as a cultural economic achievement
2. identify and associate with the many inter-related occupations with modern agriculture
3. willingness to understand the problems in the future of this wide-spread industry.

Knowledge Objectives

Students shall acquire information to develop interpretation of the following concepts and generalizations:

1. Many factors - physical, geographical, cultural and historical - have contributed to our farming industry.
   (a) physical - determine which topographical factors are involved in the cultivation of wheat.
   (b) geographical - review of the unit on Canada's geography (EPSB)
   (c) cultural - become aware of the importance of one of Alberta's primary industries as an employer and producer of many varied products.
   - to realize the importance of education for farmers and their responsibilities.
   (d) historical - appreciate the history of farming in Western Canada. The problems of early immigrants will be looked at as well as the history of machines that are used in the industry.
2. The processes of wheat cultivation, flour milling and wheat trade will be looked at.
3. Wheat is an important food grain. This will require a study of the wheat plant and nutrients of the kernel. The world's food supply will be looked at as well as the economic stability of wheat-producing countries.

Skill Objectives

Students should develop a greater proficiency in the following skills:

1. understanding and using the terminology covered in the unit.
2. organizing the development of farming in Western Canada into a chronology from the pioneer state to an industrial society.
3. constructing graphs and charts. Students should be able to interpret such information.
4. formulating research questions to be used in interviews with speakers (or farmers).
5. listening to the presentations of speakers and being able to make appropriate notes.
6. working co-operatively in group projects.
7. evaluating the alternatives proposed for future farming.
8. presenting an oral report to the class.

ACTIVITIES

One of the unique features of this unit is the wide variety of activities which gain support from Social Studies, Language Arts and Science. Following is a list of the activities that I used for the unit. They are in the sequence that I used them.

Activity #1 Review of geography unit

For the most part, this was done orally. Students should be able to read temperature - precipitation charts. Rain shadow, leeward and windward are terms they should know. A general knowledge of soil types is beneficial.

Activity #2 Bulletin Board

As mentioned earlier, this topic is ideal for study during the fall. Many students were visiting the farms of relatives on weekends. They brought in samples of grain for display. Newspaper articles at this time of year are laden with articles of harvest activities or weather concerns. Farm magazines have pictures (and prices!) of the machines used for harvest. All of these can be posted. Additions can be made as you progress through the unit - e.g. student diagrams and charts.

Every student was asked to bring a label from some product made from wheat. Out of these we made a collage for the wall.

Activity #3 Guest lecturer

I would recommend this activity to motivate a grade seven class toward an interest in farming. Student acceptance was partially due to this man's personality but his expertise and handouts were an important part as well. Contact the Rural Education and Development Association, 9934 - 106 St. T5K 1C4. Phone 423-1617.

Interesting facts from the guest speaker:
Wheat is the most important food crop in the world.
Rice is the second most important food crop.
Most of the world has a 30-day reserve of food.
Canada has a reserve that will last one year.
Barley is the main crop in Alberta

Only 8% of Canada's population is engaged in agriculture.
Twenty years ago it was 70%.

We only use 30% of the wheat we produce.
We spend 10% of our income on food.
Some countries spend as much as 60% on food.
Four percent of Canada's area is used for agriculture.

Paragraph assignment: from the information in the lecture
(a) How is agriculture important to you as an individual? or
(b) What is the meaning of the term "poor millionaires"?

See Handbook for Hand-outs. #1, #2, #3, #4.

Activity #4 Field Trip

Although I used this activity at the beginning of the unit, I would recommend it be used as a 'wind-up' activity. I thought we needed warm weather for the event so I scheduled it a bit early. Most of the activities are indoors and as long as you dress appropriately, cold weather will not interfere.

Fort Edmonton provides an inservice session for all interested teachers early in the fall (evenings). This is worthwhile. Five or six parents are needed to help guide the students through the activities at the Fort.

Students were divided into groups of six. They rotate through a series of activities including:

1. bread making
2. candy making
3. farm chores - keeping the fires going
   - feeding the animals
   - gathering the eggs
   - bringing in water
4. leather tooling
5. role acting in Bellerose School

Before the students left Ft. Edmonton, each did a sketch of one of the buildings on 1885 street. Then they did a short write-up about that particular building. Fort Edmonton gives out a hand-out with some of this material but the students did further research when they returned to the school library. At "open house" the students posted their pictures depicting 1885 Street and served bannock and candy to the parents. Recipes were handed out. Photographs were taken of the students working at their projects. These pictures were also posted so the parents could see them.

Activity #5 Vocabulary drills

I used a list of new terms that we encountered as my spelling list each week. Sometimes, I would just test for the correct spelling; with some, they were to know the meanings. A master list was kept on the blackboard. Refer to #7 in the Handbook.

Activity #6 Group work

Small groups were assigned to one of the following list of topics:

(a) a timeline on the cultivation and use of wheat
(b) wheat plant and kernel
(c) the elevator
(d) the milling process
(e) map showing wheat-producing countries of the world
(f) machines used on the farm

Students should do an 8" x 11" diagram in pencil first. The teacher can have these xeroxed and use them as hand-outs. My classes had been given rules for diagramming in science. This proved useful.

Activity #7 Notetaking and chart-reading

Notetaking was done at certain intervals. Common material was taken from the two booklets. See sheet listing student materials.

Teachers can use their discretion as to how much detail they want to cover from these booklets. You may want to give the information as handouts but I prefer to give notes and then discuss them.

Students should know how to take notes during a film or a lecture. I allowed point-form notes for student's personal use.

Chart reading can be done once the students have a common core of notes and have done some research. A sample of the chart I used is in the Handbook See #5, #6. I pass the chart out as a hand-out and then give them the accompanying questions.

Activity #8 Films

(1) The Agricultural Revolution: EPSB MP 1391 (to be used at the beginning of the unit).

This is an excellent film, especially suited to the Grade Seven level. It shows all of the progress, step by step, as man changed from a hunting and gathering society to a food-producing culture. These changes included:

(a) new hunting skills - many forests disappeared
(b) small group banding together forming villages which became permanent
    - land ownership
    - food surpluses (leading to trade)
    - specialization of labor
    - establishment of traditions - religion
(c) new tools - planting crops, harvest, storage vessels
(d) new methods - domestication of wild wheat
    - planting skills (slash and burn)

Discussion topics

The agricultural revolution is still evident in some areas of the world. What are the implications for the hunting and gathering societies in the world today?

Farming was the first evidence that man could change his environment and somewhat determine the future success of his culture.

This revolution set the stage for other revolutions. (industrial)

(2) From Farm to Supermarket: EPSB MP 2597 (to be used about mid-way through the unit.

This film emphasizes farming in Western Canada. Some interesting facts from this film include the following:

Farming is the second major industry in Canada.
Hard, red, spring wheat is the best wheat for bread-making.
Vancouver, Churchill and Thunder Bay are the three major wheat-exporting centres in Canada.
Pigs are sold "sight-unseen".
Sugar beets were once considered weeds.
Each farm laborer produces enough food for forty people.

Questions: What two provinces produce most of Canada's sugar?
What products come from the Assiniboine Basin?
What is "virgin soil"?
How long does it take for a steer/pig to be ready for market?
What is the "wheat province"?

Discussion topics: Rolling hills presented a problem for farming in southern Alberta. How was this problem solved?

"Some years we have too much." Explain this statement - remembering that some nations are starving.

(3) Agriculture Canada: EPSB MP 3307

This film is geared for a higher level than Grade seven. However, it could be used as an overall review if time permits.

Vocabulary used:				
	forage	supplement	obsolete	mechanized silos
	automation	risk	minimized	feeder steers
	Charolais	Hereford		

Questions: What is the purpose of the Canadian Grain Act?
What is the purpose of the Grain Research labs?
List five "risks" in farming.
Compare the price of eggs quoted in the film (with today's prices)

Discussion topics: The farmer must do his homework in chemistry, accounting and mechanics. Explain.
"The 'hunch' in farming is gone." Explain.

Activity #9 Oral reports

Two topics were given -

(a) How is linen made?
(b) How is macaroni made?

Students chose one of these topics and presented them in class. The rest of the class voted on a mark for these presentations. Consideration was given to two major ideas

(i) what did we learn about farming?
(ii) what was the general impression of the presentation?

This system worked fairly well. It was surprising to see that the student evaluation was very similar to the mark I would have given. However, another time I would give more choices in the topics. Boredom is a factor when you hear the report repeatedly. Participation in marking helped maintain their interest.

EVALUATION

1. Multiple choice questions. Teachers can use these questions or make up their own.

2. I added paragraph questions to the unit test including:
   (a) Why I would like to be a Farmer
   (b) Life in 1885
   (c) Problems and Risks of the Farmer Today

These paragraph choices turned out to be most interesting. Many students chose to write on the last topic and in their paragraphs I realized that some of my objectives had been achieved. Students concluded that it would be very difficult to establish themselves as a farmer today. They had listed some estimated costs of basic requirements for a farm one day during class discussions. Their paragraphs indicated that they would never be able to afford these materials.

Students had become aware of the many risks involved for the farmer and expressed sympathy for the farmer's dependence of weather and economic factors. Some realized the importance of a modern education for today's farmer. They admitted that they had changed their attitude toward farmers. The successful farmer had to be ambitious and skilled in many fields - chemistry, accounting and mechanics to mention just a few. One student made the comment that "the only way he would be a farmer is if he had 50 people working for him."

Students were amazed at the many varied occupations associated with farming. Another year I would make a master list of these occupations. Our collage of wheat byproducts was quite huge. Students had not previously associated some products like cookies or bran flakes with wheat. Nor did they associate linen or cooking oil with farming.

By the end of the unit, many of the students could identify the farm machines and describe their use. They could identify our major grains as well.

I had the same class groups for Social Studies and Language Arts. This made it convenient to overlap assignments in both areas. (These were also the areas in which I have training.) Having the same group for three or four periods a day made it easy to follow up on all assignments. I could discuss the marking of written work with an individual while the rest were doing group work.

It is co-operation from many sources that make this unit work. I found parents most helpful as well as the people at Ft. Edmonton and the Rural Education and Development Association.

Multiple Choice Questions

Wheat probably existed on earth as long as
(a) 70 centuries
(b) 6,700 years
(c) 75,000 years
(d) man's existence

Wheat has been cultivated as a basic food crop for
(a) 70 centuries
(b) 6,700 years
(c) 75,000 years
(d) 2 million years

Early civilizations tended to be centered
(a) in the south latitudes
(b) in the north latitudes
(c) in Asia
(d) wherever wheat was growing naturally

The most popular wheat food is
(a) pizza
(b) pasta
(c) macaroni
(d) bread

The first wheat food was probably
(a) boiled and eaten as a porridge
(b) stripped of its husk and chewed
(c) boiled and eaten like potatoes
(d) ground into flour for bread

Wheat has a cellular structure that enables it to act quickly with yeast.
(a) True
(b) False

An early grass believed to be the ancestor of the wheat plant is
(a) millet
(b) maize
(c) einkorn
(d) sorghum

The ability for wheat to maintain its characteristics in succeeding generations is the result of
(a) cross-breeding
(b) selective breeding
(c) self pollination
(d) cross-pollination

The part of the kernel rich in vitamin B and which protects the seed is the
(a) endosperm
(b) bran
(c) wheat germ
(d) embryo

The part of the wheat kernel from which we get our flour is the
(a) endosperm
(b) bran
(c) wheat germ
(d) embryo

The spikes on the barley plant are called
(a) glumes
(b) culms
(c) beards
(d) rachis

Wheat is the most important food crop in the world. What crop ranks second?
(a) barley
(b) rice
(c) rye
(d) sorghum

Twenty years ago, 70% of Canada's population was engaged in agriculture. What percentage is engaged in agriculture today?
(a) 50%
(b) 40%
(c) 20%
(d) 8%

The stalks of a plant are fermented. This process separates the fibres from which we make linen. This process is called:
(a) rotting
(b) retting
(c) screening
(d) fermenting

The plant from which we get the fibres to make linen is
(a) canola
(b) rape
(c) flax
(d) rye

Another product that we get from this plant is
(a) turpentine
(b) linseed oil
(c) polish
(d) wax

Which one of the following is <u>not</u> a wheat food?
(a) chapati
(b) bulgur
(c) pasta
(d) hominy

One slice of bread without butter contains an average of how many calories?
(a) 82
(b) 100
(c) 50
(d) 250

The largest countries that produce wheat are not necessarily the greatest exporters of wheat.
(a) True
(b) False

The three largest producers of wheat are
(a) U.S.A., Canada and Australia
(b) Russia, U.S.A. and China
(c) U.S.A. Canada and India
(d) Russia, Canada and U.S.A.

Wheat needs a climate with how many frost-free days?
(a) 120
(b) 150
(c) 160
(d) 170

A special kind of wheat flour is needed for macaroni. This is called
(a) spring wheat
(b) winter wheat
(c) durum wheat
(d) canola

The two major constituents in this type of wheat that make it especially suitable for macaroni are
(a) carbohydrates and protein
(b) gluten and protein
(c) gluten and bran
(d) pasta and macaroni

All Canadian wheat for export must be graded. What criteria is considered for this grading?
(a) starch content
(b) protein content
(c) yield
(d) diseases

A shipment of Canadian grain abroad is accompanied by an official government document called the
(a) The Certificate Final
(b) The Canadian Wheat Board Approval
(c) Canadian Inspection
(d) Canadian Certificate

There is an established amount of wheat that each farmer can take to the elevator. This is called
(a) the bushel content
(b) the dockage
(c) the cash ticket
(d) a quota

How is grain loaded onto railway cars?
(a) elevator spouts
(b) jute bags
(c) conveyor belts
(d) manual labor

There are two main kinds of wheat. They are
(a) winter wheat and spring wheat
(b) hard wheat and soft wheat
(c) white wheat and durum
(d) white wheat and red wheat

Canada's two most important terminal elevators are at
(a) Vancouver and Halifax
(b) Vancouver and Churchill
(c) Vancouver and Goderich
(d) Vancouver and Thunder Bay

Three countries that buy most of Canada's wheat are
(a) China, U.S.S.R. and Japan
(b) China, U.S. and Japan
(c) U.S.S.R., U.S. and the Phillipines
(d) U.S., Mexico and the Phillipines

Under the Wheat Board system, every farmer receives the same basic price for his wheat.
(a) True
(b) False

The process whereby moisture is added to the wheat kernel to loosen the bran is called
(a) screening
(b) breaking
(c) tempering
(d) milling

In man's attempt to have white flour, he has
(a) erased many diseases
(b) been able to make many new products
(c) wasted much of the kernel
(d) removed the vitamins of the kernel

In Alberta, the standard size of loaf when baked is
(a) 20 ounces
(b) 22 ounces
(c) 25 ounces
(d) 28 ounces

Vitamins are added to our flour supply. Such flour is referred to as
(a) vitamin-rich
(b) whole wheat
(c) enriched
(d) wheat germ

WHO AM I

Cam Eddy

MAJOR THEMES

This unit integrates the two areas of Language Arts and Social Studies with emphasis on the students' written work. The major themes that the students involve themselves with are:

(1) writing paragraphs;
(2) personal essay or autobiography;
(3) charting their family history;
and (4) making a personal assessment or inventory of their likes, dislikes, and interests.

The culmination of their written work takes the form of a class project for a Heritage Day Project.

TIME

A total of approximately 20-25 periods were used. The time was allotted according to the following activities.

(1)	Life-Line	2-3 periods
(2)	Poster Project	2-3 periods
(3)	Who Am I Charactoon	2-3 periods
(4)	Personal Essay	2-3 periods
(5)	Family Tree	1-2 periods
(6)	Map Work	3-5 periods
(7)	Culmination	2-3 periods

It is possible for the teacher to omit specific assignments and merely have the students work towards the construction of the autobiography. However, all activities have been used in the classroom and can be reconstructed as outlined or sequenced to suit the individual needs of each teacher and classroom.

SUBJECT AREAS

The grade seven Social Studies curriculum emphasizes the study of cultural backgrounds. This unit introduces this concept by having the class trace the personal heritage of each individual student by the use of maps.

The Language Arts curriculum stresses five skill areas that should be developed: Reading; Listening, Speaking, Writing and Viewing. This unit places its emphasis on Writing; Listening and Speaking. However, the primary emphasis is placed on the development and improvement of the students' writing ability. As the unit progresses the class can create lists of words that can become new words for spelling or vocabulary improvement. The unit allows for the personal touch of each teacher who wishes to use it.

RATIONALE

The inspiration for this unit was an attempt to involve the students and to become acquainted early in the year. Like all Junior Highs, our classes were a collection of students from several feeder schools; therefore, this unit is an attempt to help the students become acquainted through a meaningful learning experience. With this philosophy as the basis for the unit some of the main purposes of the unit are as follows:

1. Allowing the teacher and students to become acquainted early in the year.

2. Allowing for the administration of diagnostic tests as if they were natural assignments.

3. Allowing the standards for written work to be established.

INTENTS

There are several broad goals that this unit attempts to achieve. These goals are based on the Language Arts Curriculum but also cover some of the domain of the Social Studies Curriculum.

These goals are:
1. Meeting and accepting new acquaintances.
2. Showing tolerance of others and their backgrounds.
3. Integration of Language Arts and Social Studies.
4. Making use of personal experiences as the base for written work.
5. Appreciating the efforts made by their ancestors and families in the building of our society.

Some of the specific objectives are:

Language Arts Objectives

(1) Writing in complete sentences
(2) Constructing various types of paragraphs, such as
    (a) Introductory
    (b) Descriptive
    (c) Expository
    (d) Concluding
(3) Constructing an outline for an essay.
(4) Writing an autobiography.
(5) Constructing posters.

Social Studies Objectives

(1) Charting a family tree.
(2) Tracing maps which show the routes of their ancestors.
(3) Labelling and coloring maps.
(4) Plotting the travels of their immediate family.
(5) Demonstrating their appreciation of their ancestors through oral and written communication.
(6) Understanding people from different cultural backgrounds.

ACTIVITIES

There are approximately seven student activities for this unit. The rationale and teacher procedures are outlined below.

Activity #1 The Life Line Project - The Introduction Project

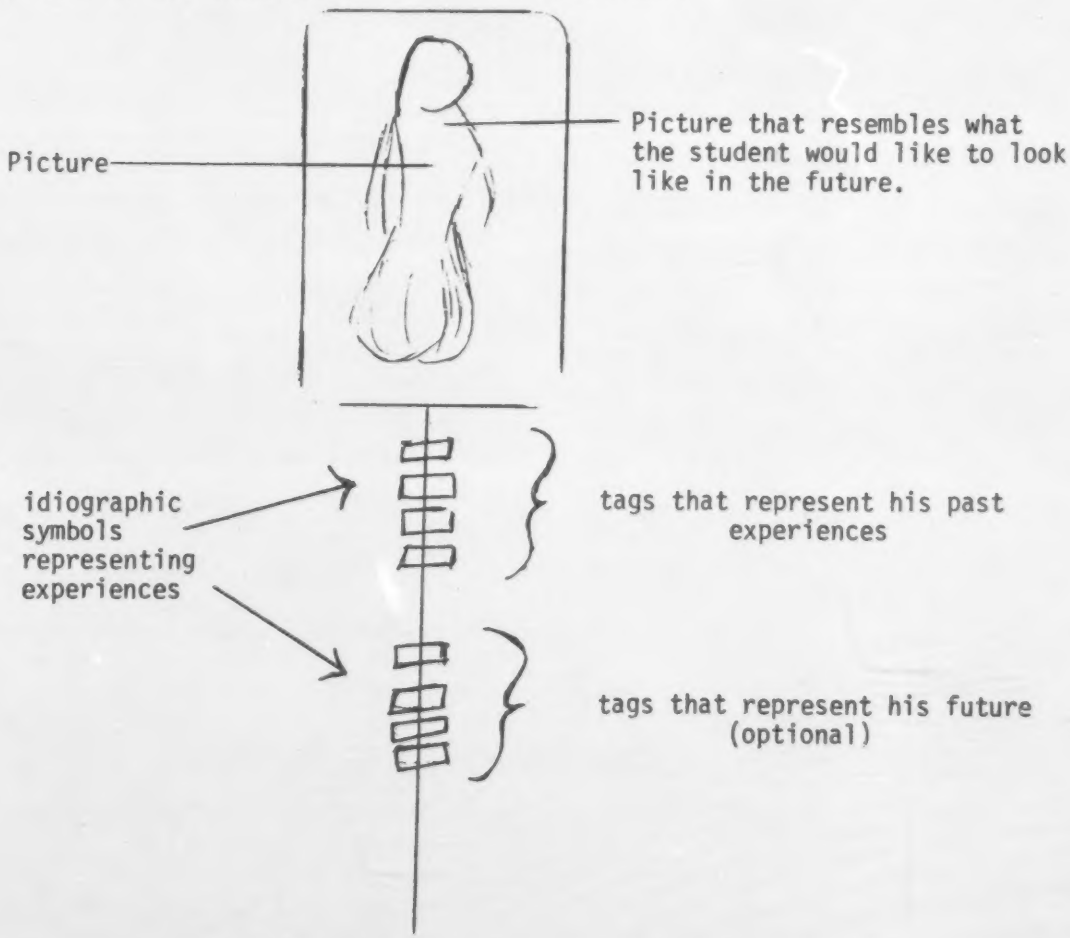
This initial project causes the students to categorize events in their lives as either happy or sad. They are directed to list 5 happy and 5 sad events (see student handout) that have occurred in their life. Be sure they have an equal number of each.

This activity is important because it creates an awareness of personal research and directs the students to write on a topic they know a lot about, themselves. The teacher also directs the students to record information with idiographs, the first legitimate form of writing. At this stage the teacher may introduce several ancient forms of idiographic writing.

When the students complete their life line project the students are placed in small groups and share their experiences. Stress is placed on the following skills:

(a) The speaker must speak clearly.
(b) The listener must listen and ask questions only to the speaker.

An example of the student's life line is as follows:


Picture
Picture that resembles what the student would like to look like in the future.
idiographic symbols representing experiences
tags that represent his past experiences
tags that represent his future (optional)

Activity #2 Poster Project

In the Poster Project the teacher should stress specific writing skills and poster designing principles.

The young writer will have difficulty categorizing the various components of the poster; therefore, the outline is given to the class. However, if the student wishes to change any of these subtitles he should be encouraged to do so, if the teacher sees that his suggested ideas are relevant, otherwise, discourage any new ideas.

It should be pointed out to the students that the poster is merely a brainstorming session for an essay that will follow, and the ideas they put on their posters may differ to ones they actually select for their essay.

The actual procedures are as follows:

(a) Give the students a sheet of 8" x 11½" paper.
(b) Give them 2 or 3 different ways they may subdivide it for a poster. (see student handout)
(c) Label each of these sections and list ideas in point form under each of the sections.
(d) Transfer these ideas onto a large piece of construction paper.
(e) Stress that lettering should be standard, and that it should be either vertical or horizontal. Each section of their poster should be distinct and discrete from all others. This helps them see the various components of the essay more clearly.

Activity #3 The "Charactoon"

This activity could replace the initial activity. Note that this project is an example of what one may find in a student year book, and it may be displayed on the wall as a representation of a page from a school year book, or the pages could be compiled into a book as was done for this unit. This assignment allows the students to consider themselves as they are today and what they have become as a result of part and present experiences. This assignment allows the teacher to direct the class to recognizing the current fads and fashions of the day and compare these to a decade ago.

Procedures for Charactoons

1. Have students list the details of their interests.
2. Create a charactoon (character in cartoon form) that represents these interests.
3. The face they choose could be selected from a comic, magazine, etc. Or it could be an exact picture of themselves.

Activity #4 Personal Essay

Using the ideas that were put on the poster create a paragraph for each of the various topics. The teacher need not review the various components of the paragraph if the essay is to be used as a diagnostic test as a measure of the students writing ability. If this is not the teacher's purpose than teach the various components of the paragraph as well as the need for introductory and concluding paragraphs.

Actual Procedures -

1. Give the students their outline as presented in their poster project.

2. Stress the purpose of
   (a) The topic sentence
   (b) Developmental sentences
   (c) Concluding sentences
   (d) Introductory paragraph
   (e) Developmental paragraphs
   (f) Concluding paragraphs

3. Stress that the rough copy is to be double spaced.

4. Have students edit their essays in a different colored pen using the lines they didn't write on.

5. Rewrite essay.

Activity #5 The Family Tree

The purpose of the family tree causes the students to relate to their immediate ancestors and create personal research. Its purpose demonstrates how a simple project can become complicated as one asks for more details. It is also a source for story gathering that relates to specific periods of time in history, and gather actual accounts of their lives. The concept of generation can be explained and time can be spent on the fads and fashions of each generation.

Activity #6 Map Work

The map work is basic to any Social Studies class. Have the necessary maps on hand that would be necessary for your location, such as:

(a) Alberta Map
(b) Canada Map
(c) North American Map
(d) World Map of
   (i) Eastern Hemisphere
   (ii) Western Hemisphere

It should be noted that my partner was responsible for the Social Studies component of the curriculum and I did not stress much Atlas work. The teaching of the knowledge was left to him. I stressed only coloring, neatness and spelling.

Activity #7 Culmination

The culmination of this mapping project was concurrent with Heritage Day at our school. A large world map had lengths of wool strung from Edmonton to various countries the ancestors of the class originated from. The smaller maps surrounded the large world map.

EVALUATION

Student Evaluation - Evaluation of Unit - Part I

1) Poster Project Containing Life Line

Following directions---------- 5
Neatness ---------- 5
Oral Presentation (optional) ----------10
20

2) Poster Project - Autobiography

Following directions	10
Neatness	10
Content - Spelling	10
Grammar	10
Arrangement	10
	50

3) Family Tree

Following directions	5
Neatness	10
Effort to find information	10
	25

4) Maps are marked on basis of neatness, coloring, spelling and other areas the teacher wishes to stress.

Suggested Method

1. Accuracy	10
2. Coloring	10
* land one color	
* water one color	
3. Legend	10
4. Title & Lettering	10
	40

Evaluation of Unit - Part II

Language Arts Exam

1. Write an introductory paragraph on one of the following topics:
   (a) My favorite birthday.
   (b) The day I received my first bicycle.
   (c) My secret place.

2. Write a descriptive paragraph on one of the following topics:
   (a) My Merry Bedroom.
   (b) My Favorite Outfit.
   (c) Our School Yard.

3. Write a concluding paragraph on any one of the topics in question one or two.

4. Map Question:
   Create map questions that relates to the information the students gathered.
   (a) One map should be about local information.
   (b) One map should be about world information.

EVALUATION

The first impression of the students' reaction could be summed up by saying they became quite attached to all the projects they made. The students were disappointed when the posters came down from the wall. Other teachers who saw the students' assignments said they would like a copy of the directions.

If a teacher has a personal flair for including art into language activities this unit becomes even more enjoyable. This aspect of including art as a creative component of Language Arts adds a very important component in students' expressiveness.. In fact, those students whose writing skills were weak, became more relaxed while expressing themselves through the media of art and charting projects.

Many Language Arts teachers seem to be always concerning themselves with new ways of getting students to write. This unit, though it didn't circumvent this concern, did involve the student in such a manner that the teaching of such skills as spelling, proof reading, and editing became more meaningful.

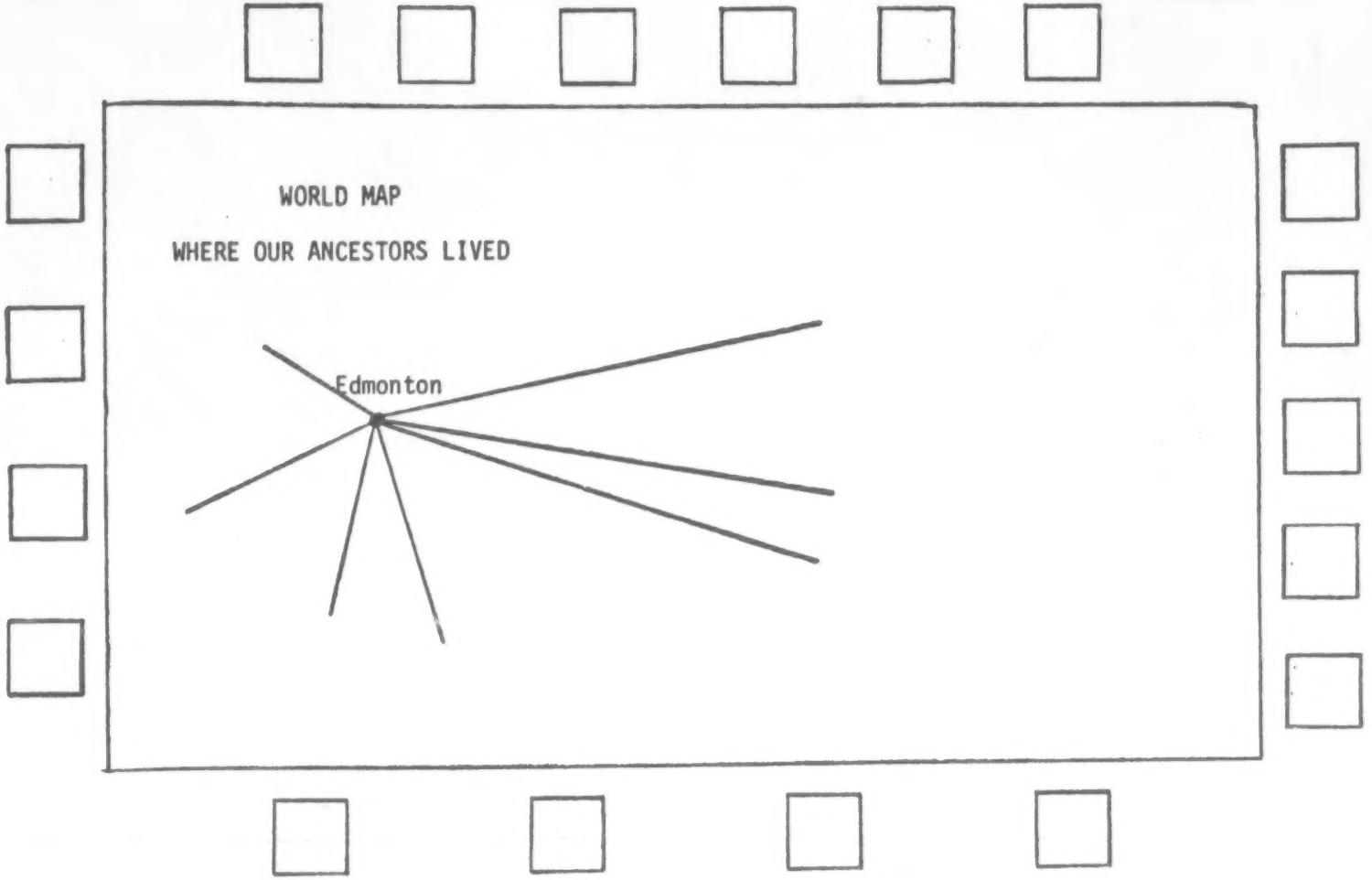
The main point that I would like to end on is, the things that were learned by the teacher were extremely useful throughout the year. Such things as, who was the best printer, the best chart maker, the best artist, the best cartoonist, became extremely useful as the year progressed. When the unit is done another year these are components that could be stressed as the unit progressed.

Other Culminative Activities

Depending on the class and the interest developed you may find it interesting to do some of the following projects:

1) Research specific fads and fashions over the years: as a Bulletin Board display
2) Music of the teen years of the earlier times can be set up as an interest centre
3) Create a Heritage Day and celebrate some of the customs that are present in your class
4) Have a birthday party that celebrates all birthdays of the classes' ancestors.

All of these activities have been tried quite successfully.



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94

95

FINAL CULMINATION

STUDENT HANDBOOKS

FOR

THE BEAVER

DAIRY FARMING

DISASTERS

MULTICULTURALISM

PLANTS-RATE, RATIO and PERCENTAGE

LIBRARY RESEARCH REPORTING SKILLS

WHEAT FARMING IN WESTERN CANADA

WHO AM I

THE BEAVER

Developed By

Mervin Tuplin

An Interdisciplinary Unit in Science and Language Arts.

STUDENT HANDBOOK - GRADE 7

Table of Contents

1. Discussion on criteria for Eager Beaver Award
2. What am I?
3. Background Information
4. Film - The Age of the Beaver
5. Beaver Kit
6. Slide Set
7. Map Study of Beaver Site
8. Field Trip
9. Word Search
10. The Beaver and Its Environment

THE BEAVER

STUDENT HANDBOOK

Language Arts Component

Literature
- Activity #1 Grey Owl
- Activity #2 The House of McGinnis
- Activity #3 Questions on the story
- Activity #4 Library Books

English
- Activity #1 Kinds of Sentences
- Activity #2 Descriptive Paragraph

Spelling
- Activity #1 Vocabulary
- Activity #2 Dictation

Science Component

(The author would like to recognize E.P.S.B. Life Science C.R.I.B. and Lloyd Pearce as major contributors to this component.)

Science Activity #1 Discussion on criteria for Eager Beaver Award
Activity #2 What Am I.
Clues to What Am I?

Clues to WHAT AM I? Work Session

This page gives you a great deal of information on an unknown animal that lives in Alberta. Your job is to try and figure out which animal of those that are listed below best fits the clues that are given. The clues will tell you where it lives, some of the things it eats and some of the things that eat it. Follow the instructions step by step and record all your work on Work Sheet C. Do not write on this page.

WHERE I LIVE INFORMATION (As in the survival game, a place, a distance and a direction are given for you to plot on the map.)

1. High Level (12-NE)
2. Peace River (6-NW)
3. Garden Creek (1-E)
4. Athabasca (5-N)
5. Brooks (2-SW)
6. High Level (4-NW)
7. Chipewyan Lake (5-S)
8. Wetaskiwin (3-W)
9. Edson (4-NW)
10. Athabasca (12-W)
11. Banff (1-NE)
12. Lethbridge (2-W)
13. Medicine Hat (5-S)
14. Drumheller (2-NW)
15. Fort McMurray (1-E)

WHAT I EAT My main diet is poplar but I also nibble on willow, fir, pine and birch if it is available. It may or may not be a good clue to say that I will also eat waterlily.

WHAT EATS ME A lot of animals will eat me if they can catch me, although I'm not the easiest animal to catch. Some of my predators include the wolf, lynx, wolverine, and especially when I'm young, hawks, owls and mink.

Step 1 Plot the distribution data on the map on Work Sheet

Step 2 Lightly shade in the range of the unknown animal as it is found in Alberta.

Step 3 List the 10 animals on your work sheet, from the list below, that you think are the least likely to be the animal in question.

Artic Loon	Common Crow
Barren Ground Caribou	Mallard Duck
Beaver	Mountain Goat
Bighorn Sheep	Spruce Grouse
Bison	Wood Duck
Blue Grouse	Woodland Caribou

Step 4 On the work sheet,give a reason for each animal eliminated.

Step 5 Write down your best guess as to the animal's identity, and give up to three reasons for your choice

Step 6 Check any maps or books that are available to try and determine if your first guess was a good one or if you would like to change your guess based on some new information that you have found. Give reasons for either decision.

Step 7 On the work sheet, draw an 'eats it/it eats' diagram for your animal.

Step 8 If time permits, record on another piece of paper any additional information concerning the animal you have been tracking down, that you have learned from the books or maps that you have consulted. Information on the animal's size, colour, additional food sources, enemies, relationship to man, unusual habits of behavior such as the method of hunting or feeding, hibernation or migration behavior etc. could be recorded.

WHAT AM I?

WORK SHEET

1.

PLOT THE "WHERE I LIVE" DATA ON THE MAP.

2.

SHADE IN THE "RANGE" OF THE UNKNOWN ANIMAL.

3.

MAKE A LIST OF THE 10 LEAST LIKELY ANIMALS TO FIT THE CLUES OF THE UNKNOWN ANIMAL.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

4. GIVE A GOOD REASON FOR ELIMINATING EACH OF THE 10 ANIMALS LISTED IN STEP 3.

1. _____
_____
2. _____
_____
3. _____
_____

continued over ...

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

5. YOUR BEST GUESS FOR THE ANIMAL'S IDENTITY IS _____.
THREE REASONS FOR THIS CHOICE ARE:

1. _____
2. _____
3. _____

6. AFTER CHECKING BOOKS AND OTHER RESOURCES, FURTHER REASONS FOR MAINTAINING THE GUESS ABOVE OR REASONS WHY YOU WOULD LIKE TO CHANGE YOUR GUESS TO ANOTHER ANIMAL.

_____

_____

_____

_____

_____

_____

_____

_____

7. DRAW AN "EATS IT/IT EATS" DIAGRAM.

Science Activity #3 Background Information

Concept

The environment of an area results from the interaction of the biotic and abiotic factors.

Problem

How does a beaver affect its environment?

Background Information

(To be done in classroom before field trip to beaver site.)

In this investigation you will study a beaver dam and lodge, a beaver-created pond and a beaver workshop (tree-cutting area). In order to give you some background knowledge about the beaver and its habits, your teacher will provide you with information sheets on the beaver. Read these sheets over carefully. Then answer the following questions based upon the information given in these sheets.

The Beaver - Physical Features

1. What is the scientific name (Genus and species) of the beaver?
2. Why is the beaver considered to be a rodent?
3. What other common animals are related to the beaver (belong to the same order of mammals)?
4. Does the beaver take its oxygen supply from the air or from the water?
5. About how long and how heavy is the average adult beaver?
6. Beavers can live in ponds, lakes, streams or rivers. What must be found in the immediate environment of a beaver wherever it lives?
7. Why was the beaver so important in the early development of Canada?
8. (a) How many eyelids does a beaver have?
   (b) How do these eyelids work?
9. (a) How many front or incisor teeth does the beaver have?
   (b) How do the incisor teeth work when the beaver is gnawing?
10. (a) Which teeth grow throughout the life of the beaver, the front incisor teeth or the rear chewing teeth?
    (b) Why?
11. What specific structure does the beaver have which prevents wood chips from being swallowed?
12. How are the beaver's front feet different from the back feet? Mention two differences.
13. When does the beaver use its tail as a prop?
14. Describe the two layers of beaver fur.
15. The beaver is structurally adapted to its environment. Give examples to show this.

The Beaver Family

1. How many beavers are found in a typical family?
2. Which beavers form a family group?
3. (a) How long do beavers live?
   (b) When are the young born
   (c) How many are in a litter of young?
   (d) What are young beavers called?
   (e) How long do the young beavers "live at home" (remain with their parents)?

Beaver Food

1. What parts of plants are used for food by beavers?
2. What two types of trees do beavers prefer?
3. How do beavers obtain food during winter?

Beaver Tree-Cutting Operations

1. In what position is the beaver's head held when cutting is being done?
2. How many initial cuts are made on a tree when cutting begins?
3. What is the usual cutting pattern which the beaver uses on a tree trunk?
4. Why does a beaver run to its pond when the tree starts to fall?
5. Why does a beaver cut off the branches of a fallen tree before taking it to its dam site?
6. When does a beaver do most of its tree cutting?

Beaver Dams and Canals

1. What four materials are used to make a beaver dam?
2. How are the branches and logs placed on the dam to strengthen it?
3. How does the beaver use wet water plants in constructing its dam?
4. How is mud carried from the bottom of the water to the dam building site?
5. Why does the beaver build canals?

Beaver Lodges

1. In what two locations are beaver lodges usually built?
2. How high above the water level is the top of the lodge?
3. (a) How many rooms are usually found inside a beaver's lodge?
   (b) How does a beaver enter the room in its lodge?
   (c) How does the beaver get its air supply while in the lodge?
4. When does a beaver abandon its lodge?
5. Not all beavers build lodges.
   (a) Where do such beavers build their homes?
   (b) Where are such beavers usually found?
6. Make a diagram of a cross-section of a beaver lodge. Show the following: Water level, tunnel, tunnel entrance (lower and upper), lodge room, (den), feeding shelf and sleeping shelf.

Background Information on the Beaver

Taxonomical Classification of the Beaver

The beaver belongs to Phylum Chordata (it has a backbone), Class Mammalia (it has a hair-covered body), Family Castoridae (Beavers) and Order Rodentia (it is a gnawing animal); Genus Castor and species canadensis.

The scientific name of the beaver is Castor canadensis.

The beaver is the largest of North American rodents and is related to the squirrels, woodchucks, gophers, and pocket mice. The beaver is a lung-breathing animal which takes its oxygen supply from the air. Even though it spends much of its time in water, it still must come to the surface to breathe.

Size - The body length varies from about 1-1½m, with the tail averaging 25 to 30 cm. Average weight is about 18kg (40 lbs.)

Habitat - Beavers live in rivers, streams, lakes and ponds which have nearby wooded areas.

Range - Beavers are found in Asia, Europe and North America. Constant trapping and shooting have greatly reduced the beaver populations of North America.

Historical Importance

The beaver was one of the reasons for the early settlement of North America and particularly Canada. The early pioneers and Indians ate beaver meat and also used its fur for trading purposes. Trading companies shipped beaver furs to all parts of the world for use in making coats and hats. Beaver fur is soft and shiny and wears particularly well.

The Beaver's Body

(a) The Head - The head is broad with large powerful jaws. It has rounded ears and nostrils which can be closed tightly to keep out water. The eyes have three eyelids - two outer and one inner. The inner eyelid is transparent and allows the animal to see under water while at the same time protecting the eyes against injury from objects in the water.

(b) The Teeth - The beaver has four front gnawing teeth and sixteen back chewing teeth. The four front teeth (incisors) have a very hard covering while the back are softer. The two upper front teeth slide down over the lower front teeth when the animal is gnawing. This causes the upper front teeth to have a chisel-like edge. The front teeth grow throughout the life of the beaver, while the back teeth stop growing after two years.

Behind the incisor teeth, the beaver has two flaps of skin which fold inward and seal off the back of the mouth. These flaps make it possible for the beaver to gnaw wood (on land or in water) without getting splinters into its mouth.

(c) The Feet - The beaver has short, black feet covered with a tough skin and light hair. The frontpaws have five toes and long, thick claws. The claws are used for digging up the roots of bushes and trees for food. The back feet are larger than the front and the five toes are webbed and clawed. The webs make the back feet like paddles, to be used for swimming and diving. Two claws on each foot are split and are used for combing the fur.

(d) The Tail - The stiff, flat tail is like a paddle. It may be up to twelve inches long and seven inches wide. The tail is covered with black, scaly skin. The tail is used for steering when the animal is swimming. It can also be used to prop up the animal when it stands on the hind legs. The beaver slaps the water with its tail to make a loud noise and warn other beavers of danger.

(e) The Fur - The fur varies from a dark brown to a yellowish brown when dry, but appears black when it is wet. The fur has two layers, with short, soft hair underneath the long, heavy hair on top. The outer hair protects against injury while the underhair provides warmth.

The Life Habits of the Beaver

(a) The Beaver Family - Beavers normally live in families of six individuals. A family group consists of the adult male and female, the young born the year before and the newborn. Beavers live as long as twelve years. The young (usually two to four) are called kits or pups and are born in April or May. The young live with their parents for about two years and then leave the family group and lodge. They find mates and set up their own families and lodges.

(b) Food - Beavers feed upon the bark, twigs, leaves and roots of trees and shrubs. Their favorite food appears to be poplars and willows.

Food is stored for winter use. Branches and logs are cut and anchored under the water near the lodges. In winter, the beavers swim under the ice and eat the bark on the branches and logs. Small twigs and stems may be eaten whole.

(c) Cutting Down Trees - The strong front teeth are used to cut down trees and peel off bark.

When a tree is being cut, the beaver stands on its hind legs and uses its tail as a prop. The tree is then grasped with the front paws while the head is turned sideways. First an upper cut is made and then a lower cut. The distance between the two cuts depends upon the size of the tree. The larger the tree, the further apart the cuts are. The pieces of wood between the cuts are pulled off with the teeth. The beaver usually cuts the wood around a tree trunk in a circular pattern. However, it often cuts through the trunk from one side only.

When the trunk starts to break, the beaver runs to the water for safety. It stays in the water until it is sure that none of its enemies are attracted by the noise of the falling tree. Then the animal goes back to the tree and finishes the job.

The branches of the tree are first removed. Then the remaining trunk or log is carried, dragged, pulled, pushed or rolled into the nearby water. The parts of the tree are used for food storage or for building, enlarging or repairing lodges or dams. Beavers often work alone and usually at night. Runways or canals run from tree cutting areas to the nearest water.

Beaver Dams and Canals

The beaver's tree cutting habits are instinctive or unlearned. Beavers will normally cut down and remove trees to nearby water bodies even if they do not have a place to build a dam or lodge.

Beaver dams are made of logs, branches and rocks plastered together with mud. Mud and stones are used to build the base of the dam. Branches and poles are then placed on top of this base and held down with rocks. The dam is strengthened by placing the poles so that the tops all lean in the same direction that the water flows. The tops and sides of the poles are plastered with more mud, stones and wet plants. Mud is brought from the bottom of the water by holding it against the chest with the front paws.

The dam height is regulated so that the top is above the water surface. Dams have been found over 350 m long and may be maintained for many years. Lake beavers usually do not build dams. Sometimes beavers dig canals to help them move logs to their dams or lodges more efficiently. These canals may be up to 45 cm deep, 60 cm wide and up to 250 m long. A beaver canal may lead from a lake or river to a nearby wooded area or it may cut across a piece of land that juts out into the water.

Beaver Lodges

A beaver lodge has a dome-shape and is built with the same materials as a dam. The lodge may be located on the bank or shore or in the water like an island. The top of the lodge is about one to two metres above the water. The underside has several underwater entrances and tunnels all of which lead to an open room inside the lodge. The floor of the room den is 10 to 15 cm inches above the water so that the beavers can stay warm and dry in the winter. Air enters the room through holes between the branches in the ceiling.

The size of the beaver's lodge depends upon the number in its family and the length of time the beavers have lived there. The lodge is repaired and enlarged as long as it is used. Lodges are abandoned only when all the food in the area is used up or enemies threaten.

Beavers living in larger lakes and swift rivers may dig dens in the banks rather than build lodges. These dens have underwater entrances and tunnels just like the lodges.

Beaver Habitat Features To Be Observed in Fall and Early Winter

A visit to a beaver habitat in the fall or early winter will reveal many features which are normally not observable at other times. This is particularly so if the creek bed and pond area have dried up. A snowless October and November may create such conditions. If the site is visited when these conditions prevail, the following may be observed:

(a) The bottom of the creek
(b) The bottom of the pond behind the dam
(c) Runways leading from the creek banks to the bottom of the creek
(d) Gorged-out areas on the creek and pond beds where tree trunks and branches have been dragged.
(e) Tunnels in the banks of the creek and pond
(f) Collections of branches and stems to be used for food storage purposes
(g) The detailed structure of the upstream face of the dam showing the meticulous packing of mud to ensure a relatively water-tight construction.
(h) A good overall view of the whole tree-cutting area. This becomes much more visible when the leaves are off the trees. The teacher may find that a class visit to a beaver site in the fall, followed by a visit to the same site in the spring, will provide a much more complete understanding of the beaver, its habits and its effect on the environment.

Unusual Beaver Adaptations

- Chisel-like teeth that never wear out or get dull. Upper teeth automatically sharpen lower teeth when gnawing occurs.
- Transparent eyelids like goggles for protection underwater and on land.

- Ear valves like ear plugs to prevent water from entering the lungs.
- Nose valves like nose plugs to prevent water from entering the lungs.
- Mouth flaps like muzzles to prevent wood chips from entering the back of the mouth.
- A tail used like a stool to sit on and a paddle to swim with.
- A waterproof fur coat which acts like a scuba diver's wet suit.
- An undercoat of fine fur for warmth and an overcoat of coarse fur for protection.
- Forepaws (front feet) as nimble as human hands.
- Hindfeet with webbed toes for swimming and split-nails for combing and grooming the fur coat.
- Oversized lungs to permit submersion in water for up to 15 minutes.
- A heart which automatically reduces its beat by one-half when underwater. (As a result the amount of oxygen needed from the lungs is reduced)
- Hindfeet which can be used as shovels for digging canals and tunnels.
- Forepaws which can be used to drive sticks into the ground just like stakes are driven in with a hammer.

Interesting Beaver Facts

- One of the largest dams built by beaver was 1350 metres (4000 feet) long and 6 metres (18 feet) high.
- A dam 7 to 10 metres long takes 2 beavers about 3 to 4 nights to build.
- One dam in Eastern Canada held enough wood, stones and mud to fill 100 large dump trucks.
- Most trees used by beavers are less than 25 cm in diameter.
- One of the largest lodges was over 12 metres wide and 3 metres high.
- The den inside the lodge is a "split-level" home with a feeding shelf (washroom and kitchen area) and a sleeping shelf (living room area).
- Beavers are busiest in October when the dam is repaired and reinforced, the lodge is repacked with mud and the stored food cache is prepared.
- Beaver kits (or pups) are taught how to build dams and lodges during the 2 years they remain with their parents.
- The beaver is slow and awkward on land because its powerful legs are not adapted for walking or running.
- The den inside the lodge is enlarged (from the inside) when the family size increases.
- A family of beavers need 1 acre of dense trees to meet its food requirements.
- In the late fall just before freeze-up, the lodge is covered with a thick coating of mud. When the cold weather comes, this mud freezes and forms an armor-like covering on the lodge. No predator or enemy can claw or chew this covering.

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3. Pearce, Lloyd G., A Series of Process Oriented Science Lessons, Edmonton: Life Science CRIB, Winter 1975/76.

4. Poling, James, Beavers - Their Extraordinary Lives and Curious History, New York: Franklin Watts, 1975.

5. OWL Magazine, "Beaver - A Busy Engineer," Toronto: The Young Naturalist Foundation, January 1978.

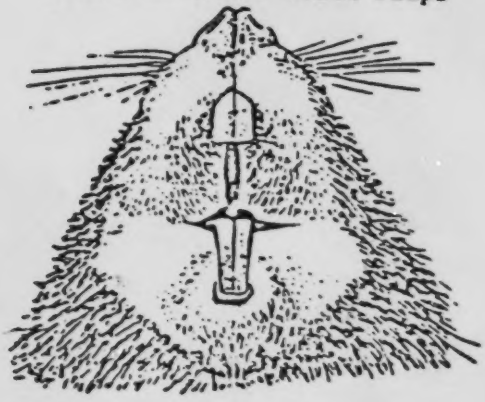
THE BODY OF A BEAVER

Front foot

Back foot

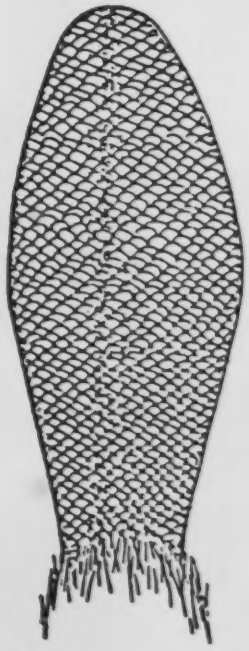
Close-up of a combing nail on the beaver's back foot

Front Teeth and Mouth Flaps

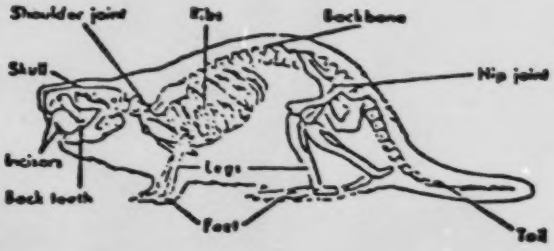


Beaver Skull

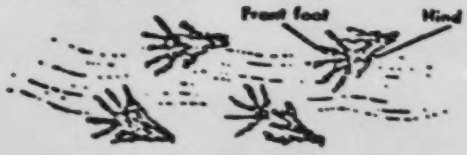
Scales on Tail



THE SKELETON OF A BEAVER



BEAVER TRACKS



Beaver-- a busy engineer

The beaver is a very clever engineer and builder. It uses many skills to do something that no other mammal except man can do, that is, change its environment.

On the following pages you'll learn how the beaver changes its environment, what life is like inside a lodge, and much more. Then, after you've read about the beaver, there's a special treat for you — a giant pull-out beaver game that's really fun to play.

A Beaver's Life

When young beavers are about two it's time for them to leave home — and just to make sure they do, their parents chase them away.

The young female, once she has left, starts to search for a good site for a home of her own; perhaps a stream with delicious aspen trees close by. The young male, on the other hand, looks out for a suitable female, and when he finds her, together they'll start building a dam across the stream she's chosen. By blocking off this stream with their dam, the beavers create a pond so deep it doesn't freeze, so they are able to swim under its icy surface even on the coldest of winter days.

The new beaver homemakers have much to do before the winter freeze-up. There's the lodge to build, and, because they do not hibernate, a good supply of food to lay away at the bottom of the pond. During winter, they'll swim from their lodge to this watery "cold food storage", then drag a few branches home to eat in comfort and safety.

With the coming May or June, the female gives birth to 3 to 5 babies. She is so protective, that before the kits are born she chases away their father. He's allowed to come back, however, when they are a couple of weeks old.

The beaver babies lose around the lodge and play in the pond until they are a year old when they must begin to earn their keep by helping to gather and store food and repair the lodge and dam. Before their new brothers and sisters are born these one-year-old-beavers, as well as their father, will be chased away temporarily to live in a bank burrow. This is all good training for their next year when they will be forced from their lodge for good and set out to begin colonies of their own.

1. *The Dam*

Beavers build a dam across a stream using logs and branches for the base, then add rocks, stumps and mud to strengthen it. They always repair their dam if it breaks or starts to weaken.

2. *The Pond*

By damming up a stream, beavers make a pond so deep it never completely freezes even in the coldest weather. There is always room to swim under the ice.

3. *The Food Pile*

The beavers' food pile of twigs and branches is at the bottom of their pond near the entrance to the lodge. Beavers keep their food pile from floating away by weighting it down with tree trunks.

4. *The Lodge*

The beaver lodge or house is usually located in the middle of the pond. It is made of branches or logs, and the top is plastered with mud which freezes in winter protecting it from predators that can reach it by crossing the ice. There are two or more entrances to a lodge and these lead up to the feeding chamber and the sleeping area.

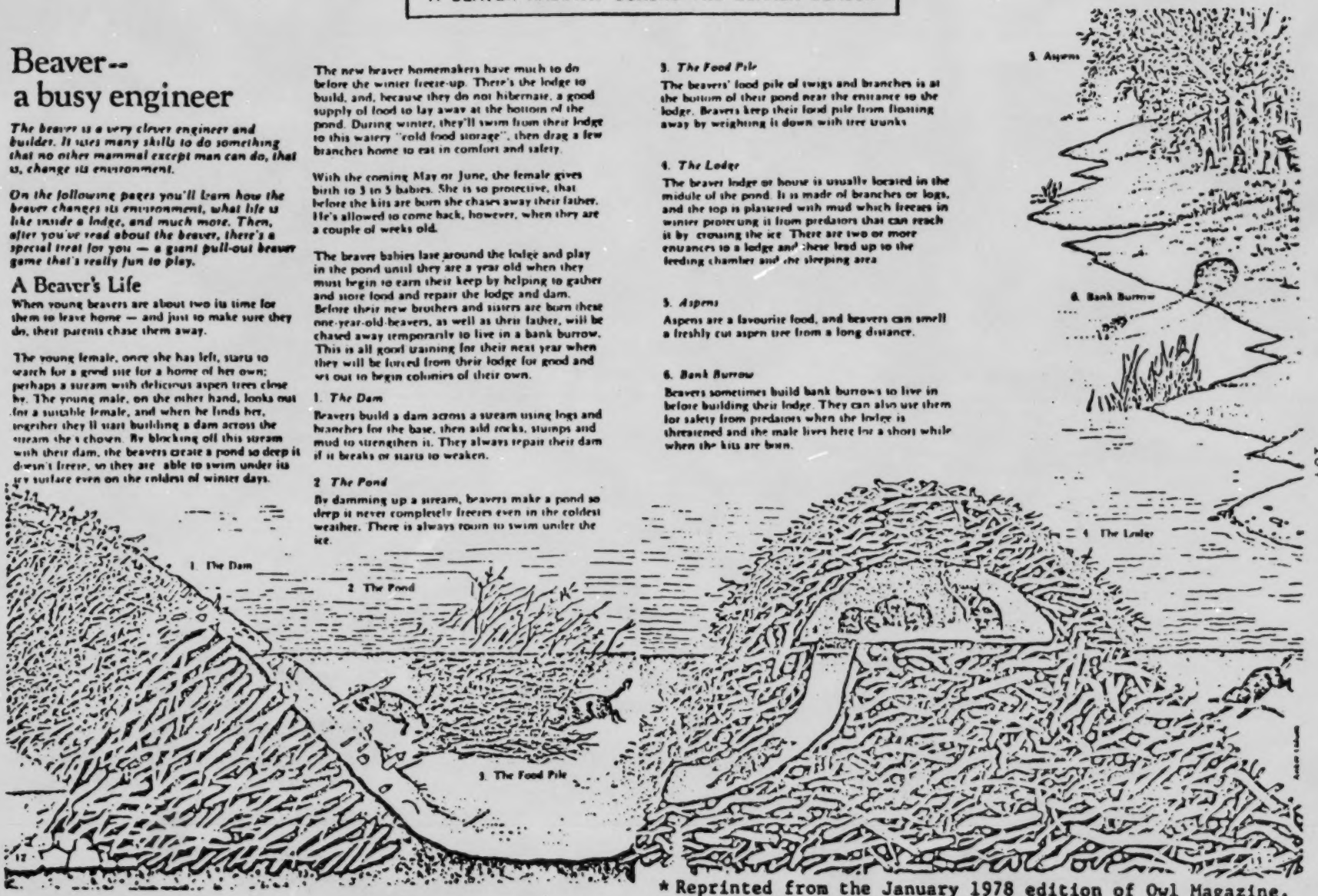
5. *Aspens*

Aspens are a favourite food, and beavers can smell a freshly cut aspen tree from a long distance.

6. *Bank Burrow*

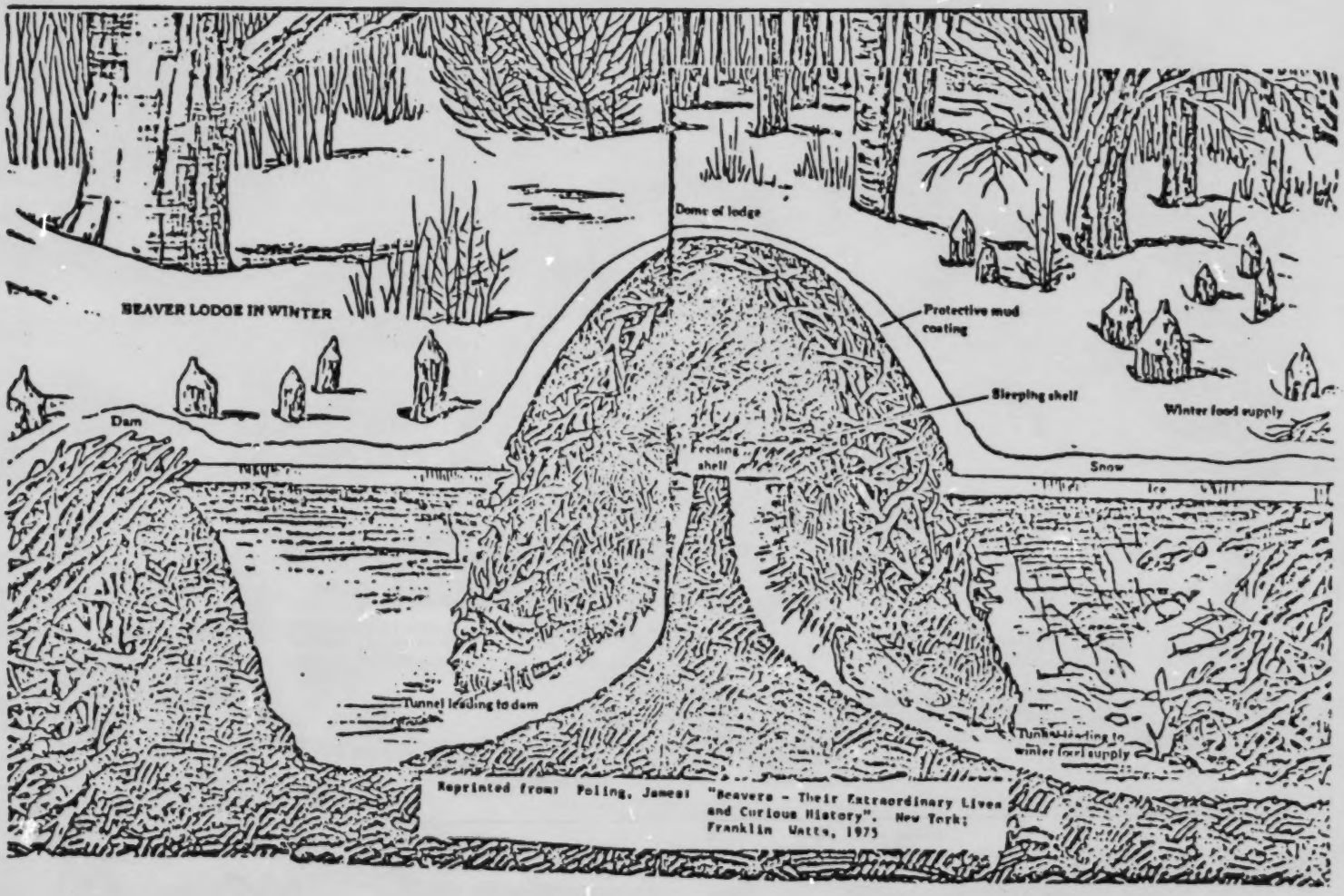
Beavers sometimes build bank burrows to live in before building their lodge. They can also use them for safety from predators when the lodge is threatened and the male lives here for a short while when the kits are born.

A BEAVER HABITAT DURING THE SUMMER SEASON



* Reprinted from the January 1978 edition of Owl Magazine.

A BEAVER HABITAT IN WINTER



Reprinted from: Poling, James: "Beavers - Their Extraordinary Lives and Curious History". New York: Franklin Watts, 1975

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112

Science Activity #4 Film- The Age of the Beaver

Science Activity #5 Beaver Kit (See Teacher's Manual)

Science Activity #6 Slide Set (See Teacher's Manual)

Science Activity #7 Map Study of Beaver Site

Your teacher will give you a map or maps showing the location of the beaver habitat your class will visit to do the field work in this investigation. Use these maps to answer the following questions.

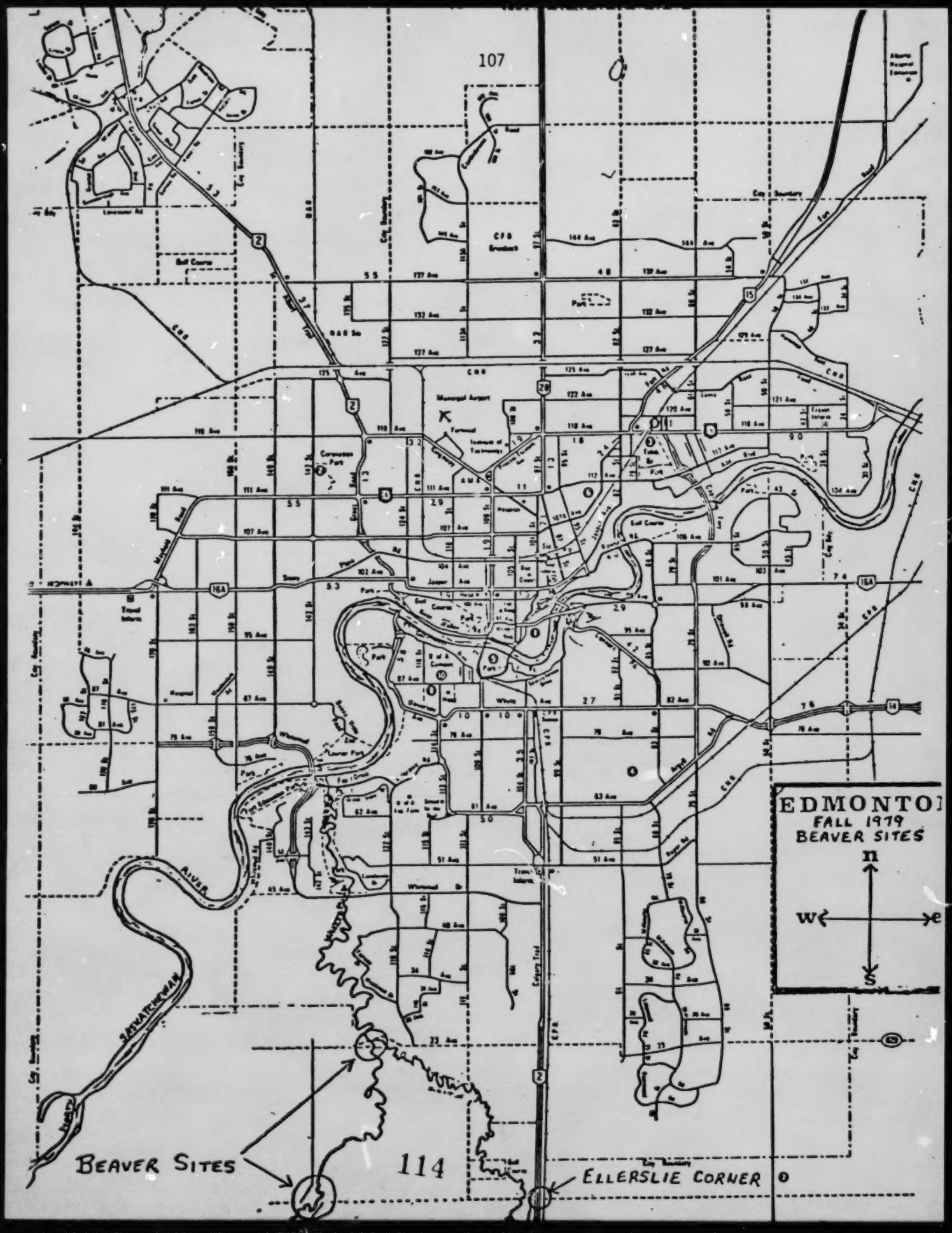
A. Map of City of Edmonton and Surrounding Area

Locate the beaver habitat site on the map.

1. Approximately how far is the beaver habitat from the school?
2. In what general direction is the habitat from the school?
3. On what body of water (creek, river, lake, etc.) is the habitat located?
4. Is the habitat located in a generally open area or a wooded area?
5. How far is the habitat from the roadway?
6. (a) Is there any housing or other human building or activity in the area of the habitat?
   (b) If there is, how do you think this would affect the wildlife in the area?
7. If the habitat you are going to visit is located on a creek, describe the course of the creek at the site of the habitat. Is it straight, or winding?
8. Outline the route which you will follow from the school to the beaver habitat site. (Use a colored line)

B. Beaver Habitat Site Map

1. Locate each of the following features on the map?
   (a) Dam (or dams)
   (b) Upstream side of dam (or dams)
   (c) Downstream side of dam (or dams)
   (d) Tree-Cutting areas
   (e) Runways (pathways) from tree-cutting areas to dam
   (f) Lodges (if indicated)
2. Indicate on the map the locations of high water (HW) levels and low water levels (LW).
3. Find out from your teacher what two or three common types of trees are found in the tree-cutting area.


EDMONTO
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BEAVER SITES
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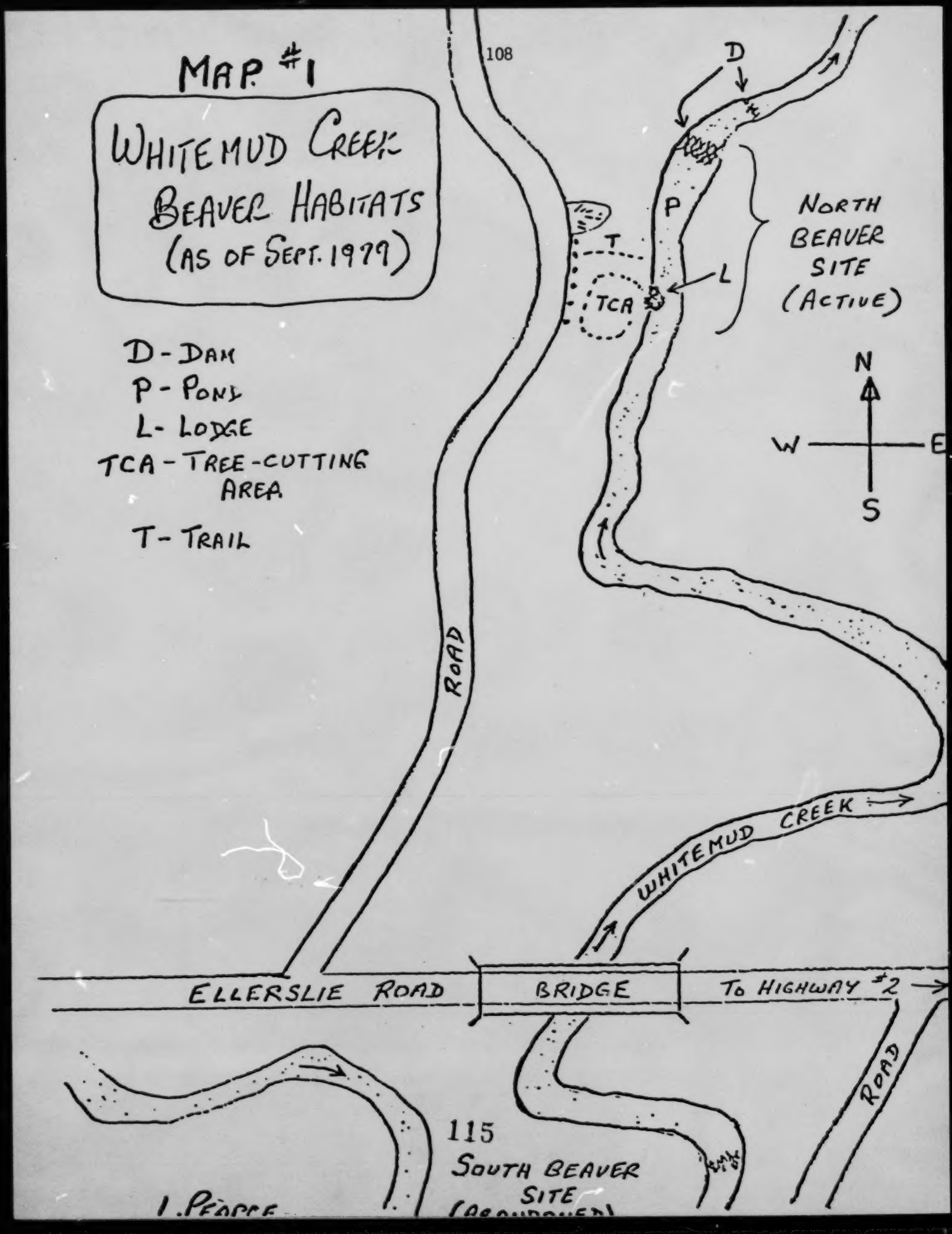
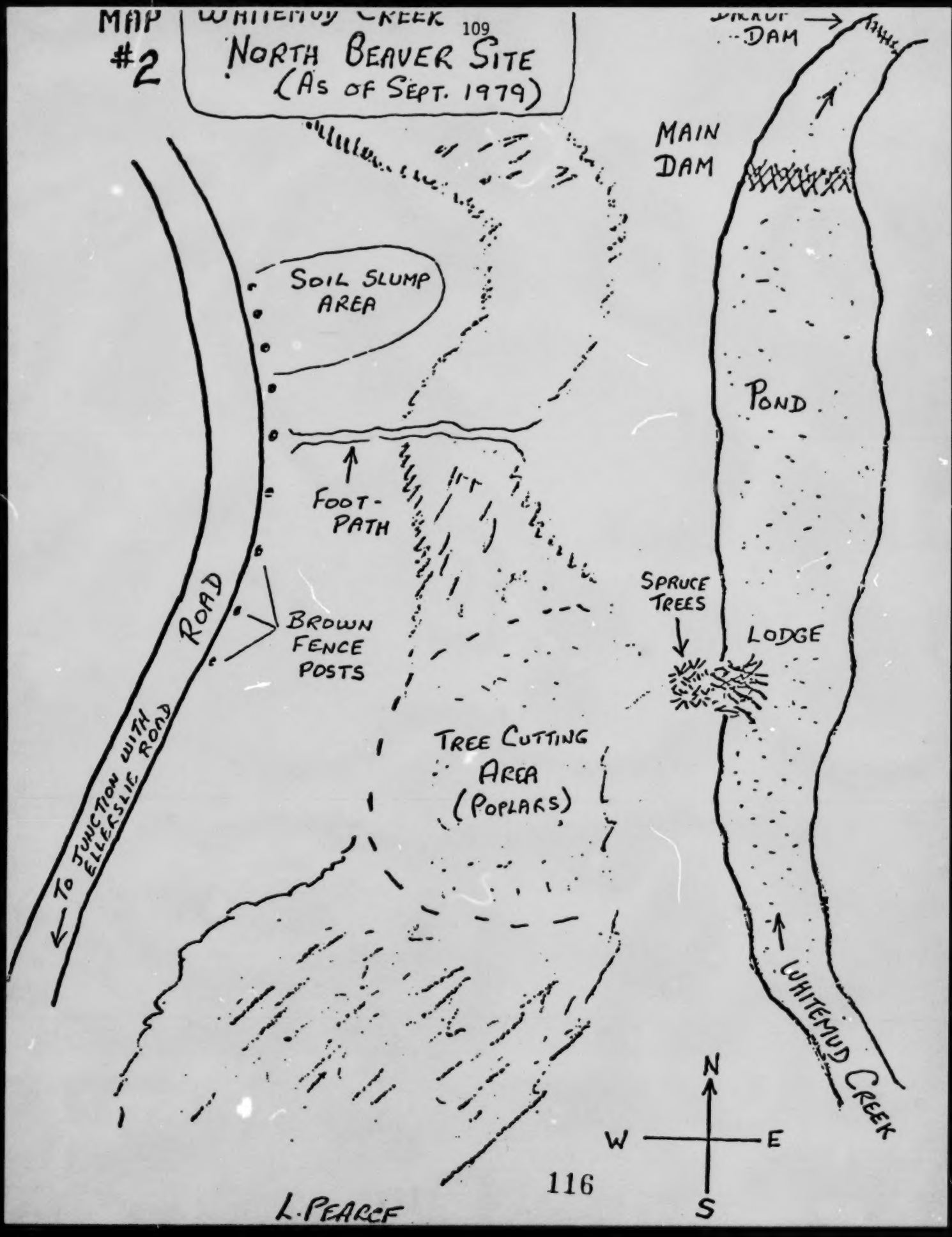
ELLERSLIE CORNER


MAP #1
WHITEMUD CREEK BEAVER HABITATS (AS OF SEPT. 1979)
D - DAM
P - POND
L - LODGE
TCA - TREE-CUTTING AREA
T - TRAIL
108
D
P
T
L
TCA
NORTH BEAVER SITE (ACTIVE)
N
W
E
S
ROAD
WHITEMUD CREEK
ELLERSLIE ROAD
BRIDGE
TO HIGHWAY #2
ROAD
115
SOUTH BEAVER SITE


MAP #2
WHITEMUD CREEK
NORTH BEAVER SITE
(As of Sept. 1979)
DAM
MAIN DAM
SOIL SLUMP AREA
POND
FOOT-PATH
ROAD
BROWN FENCE POSTS
SPRUCE TREES
LODGE
TREE CUTTING AREA (POPLARS)
TO JUNCTION WITH ELLERSLIE ROAD
WHITEMUD CREEK
N
W
E
S
L. PEARCE

Science Activity #8 Field Trip

PART A - TREE-CUTTING AREA AND RUNWAYS

Materials: Metric ruler (metre stick)
String 1 metre long
Hand lens

DO NOT DISTURB THE TREE-CUTTING AREA ANY MORE THAN YOU HAVE TO. IF YOU MOVE OR LIFT ANY MATERIALS, RETURN THEM TO WHERE THEY WERE WHEN YOU FINISH!

1. Locate an area near the beaver dam where numerous trees have been cut down by beavers. Your teacher will help you find this area. Find this spot on the beaver habitat site map and mark it with an "X".

2. Stand in the centre of the tree-cutting area which you are going to study.
   (a) How many cut trees (stumps) can you count around you?
   (b) How tall are the standing trees around you. Give an approximate height of the average tree (in metres)?
   (c) Is there a dense or light growth of trees in the tree-cutting area?
   (d) Identify, if you can, the two or three major types of trees growing in this area. (Your teacher will assist you). What type of tree does the beaver seem to prefer?
   (e) Study the cut trees. Would you say this area is presently being used by the beavers in this habitat? How do you know?
   (f) How many instances can you find in which trees have been cut but the logs have not been carried away?

3. (a) Find five different beaver-cut tree stumps. Fill in the information about them in the chart below.

No.	Fresh cut or old cut	Height of Stump from ground (cm)	Length of Cut from bottom to top (cm)	Diameter of tree at bottom cut (dm)	Kind of Tree	Approximate age of tree
1.						
2.						
3.						
4.						
5.						

   (b) Examine closely (with the hand lens) the top of the freshest stump you can find. Can you count the number of individual cuts the beaver had to make in order to go completely around the tree trunk? If so, how many cuts were needed?
   (c) Most trees are cut around in a circle so that the stump is pointed. In some cases, the beaver cuts only from one side so that a slanted, angled surface is left on the stump. Try to find some examples of this type of cut.
   (d) Find some large wood chips around a stump. What is their average length and width in centimetres?

4. Check which of the following other features you can observe in the tree-cutting area.

	FEATURE	OBSERVED (✓)
(a)	Cut logs not carried away	____
(b)	Cut logs caught in branches of nearby trees	____
(c)	Cut logs with bark eaten off	____
(d)	Cut stumps over 60 cm (2 feet) in circumference	____
(e)	Cut logs with branches removed	____
(f)	Fallen cut trees still attached to stumps	____
(g)	Other unusual features:	

_____

5. Find a main path (runway) leading from the tree-cutting area to the water.
   (a) What is the path used for?
   (b) Is it generally straight or is it curved? Why?
   (c) How many paces (or metres) is it (approximately) from the nearest cut tree to the water's edge along the path?
   (d) How wide is the path at the widest point? (From one edge to the other edge).
   (e) Study the grass and other small vegetation growing alongside the path. How can you tell that this path is used for dragging logs?
   (f) By looking at the flattened vegetation on the trail, how can you tell which direction the water is?
   (g) Follow the path to the water's edge. How is the path different where it enters the water than it is in the cutting area?
   (h) How close is the end of the path to the dam?

6. Check which of the following features you can observe along the path.

	FEATURE	OBSERVED (✓)
(a)	Cut logs left on or near path	____
(b)	Beaver tracks on path	____
(c)	Freshly-crushed grass or other plants on path	____
(d)	Dragging marks in mud on path near water	____
(e)	Other unusual features:	

_____

PART B - THE BEAVER LODGE AND SURROUNDING AREA

1. Locate the beaver lodge. Is it built on the edge of the pond or is it in the middle of the pond (surrounded by water)?

   DO NOT WALK ON THE LODGE OR DISTURB IT IN ANY WAY! THE BEAVER DOESN'T WALK ON YOUR HOME.

2. Estimate the width and height of the lodge (above water) in metres.

3. Look closely at the materials which make up the lodge:
   (a) What is the most common material used in building the lodge?
   (b) What other materials were used?
   (c) Are the dam materials packed together tightly or loosely?
   (d) Why are they packed together in this way?

4. Look at the water around the front and sides of the lodge.
   (a) If you can, locate the underwater opening to the tunnel leading to the den inside of the lodge. (It is usually in the deepest water)
   (b) Pieces of tree twigs and stems may be floating in the water around the lodge. Some of these pieces may be white in color. Why are they white?
   (c) The winter food supply is usually stored on the bottom of the pond near the lodge. The tips of the stems and branches often stick above the water. Some of them will still have green leaves on them. What does this tell you?

   (d) Look for beaver footprints in the mud on and around the lodge. Which prints are easiest to find, back feet or front feet? Why?

5. Check which of the following features you can observe on and around the lodge.

	FEATURE	OBSERVED (✓)
1.	Freshly-cut tree stems and branches on the lodge	_____
2.	Stems and branches with the bark gnawed off	_____
3.	Mud packed between the stems and branches of the lodge	_____
4.	Breathing holes leading to the den inside of the lodge	_____
5.	Canals and tunnels in the banks of the pond	_____
6.	Young willow saplings with stems snipped off	_____

6. Make a top-view sketch of the lodge and surrounding area (land and water). Show the following features: lodge construction materials, pond, stored food cache, canals, drag paths, slides, and other important features.

   BEAVER LODGE: TOP VIEW

PART C - BEAVER DAM AND POND

Materials - Metre stick

DO NOT DISTURB ANYTHING ON OR AROUND THE DAM -THE BEAVERS MAY NOT APPRECIATE IT!

1. Locate the dam indicated by your teacher. Observe the dam from as many different viewpoints as possible.
   (a) Estimate the length and width (at widest point) of the dam in metres.
   (b) Identify the upstream and downstream sides of the dam. The water is held back on the upstream side. Estimate the height of the dam on the downstream side (in metres).
   (c) How much higher is the water level on the upstream side than on the downstream side. Estimate in metres.
   (d) Is the dam straight or curved?
   (e) Which side of the dam seems to be the most even, the upstream or downstream side?
   (f) Is there any place where the water seems to be getting through the dam? If so, where?
   (g) Which side of the dam has the quietest water, the upstream or downstream side?
   (h) On which side of the dam, upstream or downstream side, would you find the thickest layer of soil and sediment on the bottom of the creek? Why is this so?

2. Look closely at the materials which make up the dam and how they are used in the dam.
   (a) What is the most common material used in building the dam?
   (b) What other materials can you see?
   (c) Look at the face of the dam. This is the side which holds back the water on the upstream side. What material seems to be used here? (Look at the underwater part of the face.)
   (d) Why do you think the beaver uses materials like leaves, grasses, mud and mosses in building his dam?
   (e) Are the logs in the dam placed in any kind of pattern? What kind of pattern?
   (f) Can you see any logs which have been placed in a vertical position?
   (g) Why would it be extremely difficult to pull a beaver's dam apart?
   (h) Is the dam presently being worked on? How can you tell if it is or not?
   (i) What effect has the dam had on the water flow in the creek?
   (j) What effect has the dam had on the width and depth of the creek behind the dam?

3. The water held back behind the dam forms a beaver pond. Study the pond and check off the features which you can observe:

	FEATURES	OBSERVED (✓)
1.	Trees on sides of pond beginning to fall into water	____
2.	Beaver paths entering pond	____
3.	Beaver slides on banks of pond	____
4.	Beaver canals running from one part of the pond to another	____
5.	Other animals living in the pond	____
6.	Other unusual features:	

_____

4. Make a side-view (cross-section) sketch of the dam and pond. Show each of the following features: dam, dam face, upstream side, downstream side, water levels on either side of the dam, direction of water flow, lodge location.

   BEAVER DAM AND POND: SIDE VIEW

5. Make a top-view sketch of the dam and pond. Show the following features: creek, dam, shape and width, pond area, direction of flow, runways, slides, lodge location, and other important features.

   BEAVER DAM AND POND: TOP-VIEW

Science Activity #9 Word Search

On following page

NAME _____

There are 34 Canadian mammals in this word search. One is "beaver." Can you find the rest.

M E R Y S E L O M K N U K S
O R E V A E B Y N A N S O H
O A E N L T A U N R R W T R
S H D O I M M L A X O T T E
E E W B A P O G F O H A E W
B R B O I M U U D K G E R N
E A N H L O U C S L N B U O
R E C O C V H S R E O O O S
E B O L O U E K K O R B B I
H W Y W C C R R N R P C I B
S O O K Y F C A I I A A R V
I L T T O M R A M N M T A B
F F E X S Q U I R R E L C L

Write the names of animals below.

1 _____
2 _____
3 _____
4 _____
5 _____
6 _____
7 _____
8 _____
9 _____
10 _____
11 _____
12 _____
13 _____
14 _____
15 _____
16 _____
17 _____
18 _____
19 _____
20 _____
21 _____
22 _____
23 _____
24 _____
25 _____
26 _____
27 _____
28 _____
29 _____
30 _____
31 _____
32 _____
33 _____
34 _____

Science Activity #10 The Beaver and its environment

1. How has the beaver changed its biotic and abiotic environment? List as many ways as you can. (Hint: think of all the things which you observed in the beaver's habitat. How would this area be different if the beaver were not here?)

2. How are the plants and animals which live in the beaver's habitat (wooded area and pond) affected by the beaver and its habits? (How are they helped or harmed?)

3. What will determine how long the beaver will remain in this area?

4. The beaver is structurally adapted to its environment. Explain what this statement means and give examples.

5. Do you think our class affected the beaver's habitat during our visit. How?

FURTHER EVIDENCE

1. Suppose a beaver family is trapped by wildlife biologists and transported to a new habitat, in an area never inhabited by beavers before. Outline the changes that would occur in the biotic and abiotic environment of the new area.

NEW PROBLEMS

1. What other plants and animals affect their environments to the same extent as the beaver does? Give two or three examples.

2. What changes will occur in the plant life in the areas where all the trees have been cut down by the beaver?

3. What happens to trees which are cut down and left instead of being moved away?

APPLICATION

1. If a large goldfish is placed in an aquarium containing a large variety of tropical fish (other than goldfish) and plants, the goldfish will likely have a very noticeable effect on its new environment. Describe the kinds of changes which would possibly occur.

LANGUAGE ART COMPONENT

Literature Activity #1 Grey Owl

Your teacher will give you a brief summary of Grey Owl who is the author of the story you will be reading. As your teacher is giving this information write down in your notebook some interesting facts about Grey Owl. Your teacher will put these facts on the board.

Literature Activity #2 The House of McGinnis.

Read the story "The House of McGinnis" silently to yourselves. Your teacher will discuss the story with you.

Literature Activity #3 Questions on the story The House of McGinnis

Answer the following questions on the story of "The House of McGinnis".

1. The author begins with a series of onomatopoeic words. What are they? What is the effect of having these words begin the narrative.
2. Grey Owl describes his beaver people in terms which show their 'almost human mentality'. He describes them sleeping, working, housekeeping, wrestling, dancing, even complaining. Find these descriptions of these operations and identify the human characteristics involved.
3. He says about the beaver that it has "the mind of a man and ways of a child". How accurate is that description? Find examples from the article that support the description.
4. Grey Owl explains why the beavers are named McGinnis and McGinty. How suitable are the names? How closely do the animals fit the stereotype of the "fighting Irishman"? What effect does giving an animal a name have on the way that animal will be perceived?
5. Compare the characteristics of a domestic pet, say a cat or dog, to those of a beaver as described here. What are the attributes of an ideal pet?

Literature Activity #4 Library Books

Your teacher will suggest to you that you may read "Wilderness Man and The Strange Story of Grey Owl", by Lovat Dickson, to find out more about his past.

English Activity #1 Kinds of Sentences

Tell what each kind of sentence the following are: Declarative, Imperative, Interrogative, Exclamatory.

1. The beaver is very slow and awkward on land because its powerful legs are not adapted for walking or running.
2. Why is the beaver considered to be a rodent?
3. Look at the beautiful beaver pelt!
4. Beaver kits are taught how to build dams and lodges during the two years they remain with their parents.
5. Be quiet near the beaver lodge.
6. How many beavers are found in a typical family?
7. Do not walk on the beaver lodge.
8. Why does the beaver build canals?
9. Trunks and branches of trees are the most common material used in building dams.
10. Beavers live in rivers, streams, lakes and ponds which have nearby wooded areas.
11. Do not disturb anything on or around the dam -- the beaver may not appreciate it!
12. Make a top-view sketch of the dam and pond.
13. Beavers feed upon bark twigs, leaves and roots of trees and shrubs.
14. How do beavers obtain food during winter?
15. Look, there goes a beaver!
16. The winter food supply is usually stored on the bottom of the pond near the lodge.
17. Study the pond and write down all the features that you can observe.
18. The beaver is the largest of the North American rodents.
19. Do not walk on the lodge or disturb it in any way!

English Activity #2 Descriptive Paragraph

1. Read the following sentences and number them in the proper sequence.
2. Choose a title for the paragraph.
3. Rewrite the sentences in the order in which you have numbered them.

_____ The young live with their parents for about two years and then leave the family group and lodge.
_____ Beavers live as long as twelve years.
_____ They find mates and set up their own families and lodges.
_____ Beavers normally live in families of six individuals.
_____ The young (usually two to four) are called kits or pups and are born in April or May.
_____ A family group consists of the adult male and female, the young born the year before and the newborn.

Title _____

Spelling Activity #1

scientific	oxygen	environment	incisor
adapted	lodge	habitat	construction
upstream	downstream	biotic	abiotic
Castor canadensis	rodent	gnawing	instinctive
efficiently	decomposers	predator	abandonment

Exercises

1. Write each of the words in alphabetical order.
2. Divide each of the words into syllables and mark their accent.
3. Write each of the words in a sentence to show the proper meaning of the word.
4. Write two words from the list that are compound words.

Spelling Activity #2

Your teacher will dictate this list of words at the end of the unit.

DAIRY FARMING

Developed By
Gerald Bonnema

An Interdisciplinary Unit in Science, Mathematics and Language Arts

STUDENT HANDBOOK - GRADE 7

Table of Contents

1. The Holstein
2. Reproduction
3. Milking
4. Culling
5. A Visit to a Dairy Farm

DAIRY FARMING

I. The Holstein

About one third of Canadian cattle are dairy cows. Others are used for meat production, and still others, dual purpose cattle such as the Milking Shorthorn and Red Poll, are used for both milk and meat.

On the dairy farm, the cow most often seen in the Edmonton area is the black-and-white Holstein-Friesian (often called Holstein). It gives far more milk than other dairy cows, with only 3.66 percent butterfat. It is almost ideal for serving large city markets, where fluid milk for drinking (market milk) is the most-used dairy product.

BREED COMPARISON ACCORDING TO MILK YIELDS

Breed	Milk Production (kg in 1969/70)	Percent Butterfat
Ayrshire	4133	3.85
Brown Swiss	4232	4.07
Guernsey	3488	4.48
Holstein	4545	3.65
Jersey	3295	4.90

Table 1*

Annual average milk production per cow in Britain 1969 to 1970.

Market milk (also called Grade A milk) has to be produced under very clean conditions and requires more equipment for cooling and handling than other milk. But it gets a better price than milk used for making butter, cheese, and other dairy products (manufacturing milk).

*Russell, K. The Principles of Dairy Farming, Page Bros. Ltd., Norwich, Great Britain, 1977. (except Brown Swiss information)

Learning Activity A

Compare milk production of the five main breeds of dairy cows using a bar graph.

Method:
1. Use squared paper.
2. Draw a horizontal guideline on the bottom and a vertical one on the left, leaving room for scales.
3. Select a convenient scale for kg along the vertical line and write in the numbers.
4. Select a convenient width for the bars and write the names of the cattle breeds below the bar-segments in block letters.
5. Select a suitable title, write it in block letters.
6. Name each scale.

Learning Activity B

Compare breed performance in butterfat productio...

Method:
1. Calculate the average annual production of butterfat per cow. Use the formula:

   n% of milk produced = amount of butterfat

2. Write your results in the following table.

Breed	Average Annual Production of Butterfat per Cow in kg
Ayrshire	
Brown Swiss	
Guernsey	
Holstein	
Jersey	

Learning Activity C

Using the information you have been given so far, respond to the following:

1. Cattle are divided according to how they are used, into three groups. Name them.

   a. _____ cattle

   b. _____ cattle

   c. _____ _____ cattle

2. Dairy farmers sometimes sell separated milk (cream and skim milk). What two other kinds of milk do they sell and what are they used for?

Type	Use

3. For what is most milk used?

4. What breed of cow is most common on North American dairy farms? Why?

5. Which common dairy cow produces the least milk yearly?

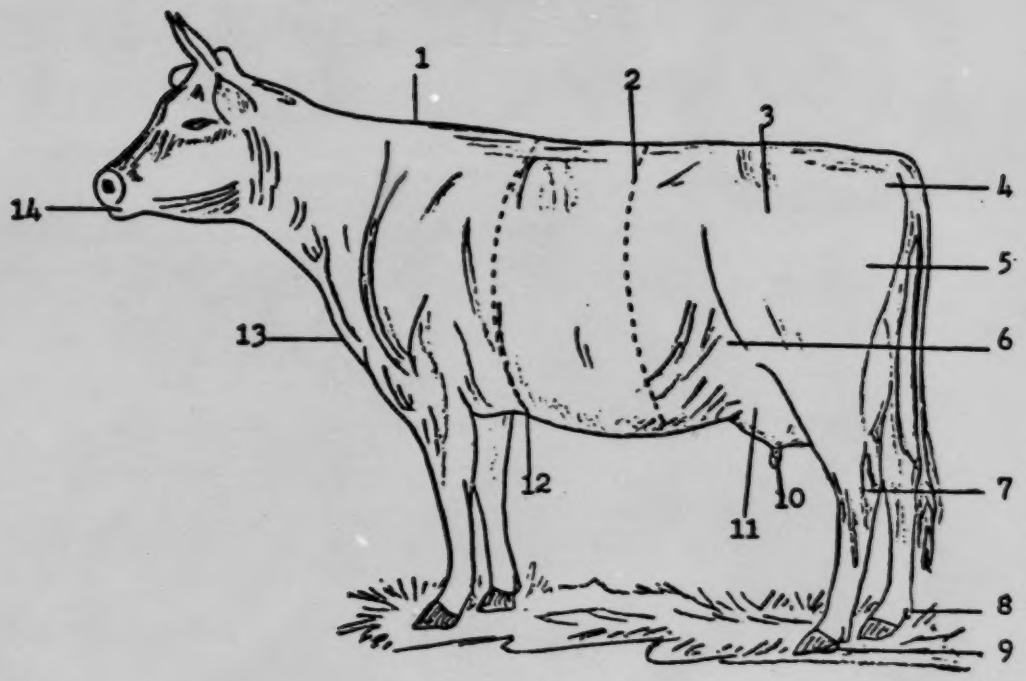
6. What difference is there in milk production between best and worst producers, among the common dairy cows?

7. Which kind of cow has the best annual average in butterfat production?

8. How much butterfat does it produce annually?

Learning Activity D

Using library sources such as encyclopedias, label the parts of the cow on the diagram. Define the terms listed.



SIRE

DAM

BREED

SERVICE

HEAT

GESTATION

HEIFER

VEAL

Learning Activity E

From several library sources, choose a number of important points about Holstein cows. First list them, including ones on the subjects on the list below. Then write them in the form of a paragraph.

Characteristics: _____ (colour)

_____ (weight of females)

_____ (weight of males)

_____ (place of origin)

_____

_____

_____

_____

_____

_____

II. Reproduction

One of the main factors that make a dairy business successful is good herd reproduction. Each cow should produce a normal, healthy calf every year. These are used for either herd replacement or veal.

Dairy cows are often replaced after only a short period of milking. In the United States, the average dairy cow spends only 3.5 years on the milking line before being replaced by another, younger cow. To supply calves, one yearly keeps three heifers for every ten cows in the herd.

The rest of the calves, if they cannot be sold as replacements or additions for other herds, will be raised for veal. The farmer can do this himself, but usually sells the calves to someone who specializes in that part of the cattle business. A special diet and feeding schedule, which may interfere with milking times and other work, is needed to profitably bring calves to the right weight quickly.

The dairy farmer wants to keep up his supply of calves for replacement of the herd and for market. He has to keep a close watch on the reproductive cycle of each cow so that as many calves as possible are produced.

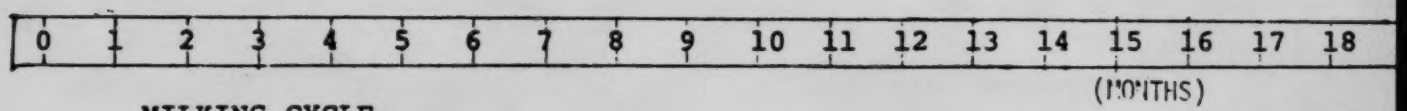
The time between breeding and calving (the gestation period) lasts about 283 days. After that, the cow should not be served for at least 75 days. Then she should be bred in the next heat period.

A heat period lasts about 30 hours, and if the cow is not served in that time, the farmer has to wait 21 days to bring in the bull -the time between heat periods. This delay is a costly one because income from calves is delayed.

Learning Activity F

Draw the breeding cycle of the cow on the time-line below. Show the breeding point as day zero. Use brackets for the gestation periods. Show the second breeding period as a space of 21 days. (The milking cycle will be given later.)

BREEDING CYCLE



MILKING CYCLE

The information that farmers keep is often stored on a computer, and a printout is given monthly. The information we will use is typical of that given dairy farmers by the computer. It is Table 2 on the next page, titled the "Edith Rogers Dairy Herd."

Among the many things listed are the breeding dates of all the cows. From this, the farmer can tell approximately when calves are due. Birth takes place about 283 days after breeding, give or take ten days.

The owner of the herd does not have to go to his calendar to figure out birth dates. He merely uses a table such as Table 3. He reads the cow's breeding date (also called date served) from Table 2 and finds the corresponding birth date on Table 3.

EDITH ROGERS DAIRY HERD

Cow Identification			Last Calving Date			Last Reported Breeding Date		Recommended grain daily	Lactation	Body Weight 10 kg	CURRENT LACTATION					
											Number of Days			Production		
Number	Birth Date Mo.	Birth Date Year	Day	Mo.	Year	Day	Mo.				in milk	dry	in calf	kg milk	kg fat	% fat
1	07	71	20	01	80	00	00	2 kg	6	043	297			4793	179	3.7
2	01	74	23	04	80	22	06	4 kg	5	054	203		143	5053	166	3.3
3	01	78	22	12	79	29	03	2 kg	1	043	320	6	228	4847	169	3.5
4	11	74	03	10	79	20	02	2 kg	3	045	348	58	266	5551	157	2.8
5	03	75	03	06	80	23	09	6 kg	3	043	162		50	3426	117	3.4
6	12	75	13	04	80	11	11	5 kg	2	050	213		1	4306	161	3.7
7	07	75	18	06	80	20	10	5 kg	3	043	147		23	3403	96	2.8
8	06	75	14	01	80	11	07	3 kg	3	043	303		124	5232	171	3.3
9	03	77	18	04	80	31	10	6 kg	1	042	208		12	3787	135	3.6
10	02	75	17	11	79	25	02	2 kg	3	043	312	49	261	5395	217	4.0
11	01	71	12	10	79	06	02	2 kg	7	050	339	58	280	6901	252	3.7
12	01	78	22	04	80	10	07	5 kg	1	042	204		125	3205	132	4.1
13	11	75	06	11	79	05	05	4 kg	2	043	372		191	7057	259	3.7
14	06	78	28	10	80	00	00	7 kg	1	045	15			273	11	4.0
15	03	77	09	04	80	19	07	5 kg	1	042	217		116	3764	135	3.6
16	03	78	27	05	80	06	08	4 kg	1	043	169		98	2039	74	3.6
17	04	76	12	05	80	05	08	4 kg	2	050	184		99	3707	150	4.0
18	03	75	15	07	80	00	00	6 kg	4	043	120			2937	89	3.0
19	06	75	10	03	80	30	05	2 kg	3	043	247		166	4477	144	3.2
20	03	70	12	02	80	06	05	2 kg	7	045	274		190	5282	173	3.3
21	01	72	19	01	80	00	00	2 kg	6	039	298			4901	153	3.1
22	01	77	01	02	80	22	05	2 kg	2	044	285		174	4349	143	3.3
23	11	76	05	05	80	26	09	4 kg	2	050	191		47	3830	102	2.7
24	04	71	21	03	80	01	06	2 kg	7	066	236		164	4391	166	3.8
25	04	77	26	01	80	19	04	4 kg	1	046	291		207	3718	132	3.6

Learning Activity H

The dairy farmer wants to know how many calving pens he should prepare for newborn calves over the next week. If his calves were born exactly on schedule, how many will be born between November 15 and December 5, 1980?

Method:

1. Locate November 15 to December 7 on the "Gestation Table for Cows."
2. Read the dates "Served" that match those dates.

   They are: February ___ to February ___.
3. If the farmer has any cows served on those dates they will calve November 15 to December 7. Look at the "Last Reported Breeding Date" and locate the cows that were served on the days in no. 2.

   They are: cow number ___, ___, and ___.

Learning Activity I

Which cows should be bred when next in heat? Today's date is November 12, 1980.

Method:

1. On a calendar, count back 75 days from November 12. (This has to be done because a cow must go 75 days after calving before breeding.)

   That date is: _____, 1980.
2. Locate the cows that have calved but have not, after that, been bred. They have zeroes under "Last Reported Breeding Date."

   They are cows numbers ___, ___, ___, and ___.
3. Which of the cows in number 2 have bred before the date in number 1? These are the cows that should be bred when next in heat.

   They are: cow number ___ and ___.

III. Milking

The udder of the cow produces her milk. Inside are millions of milk producing parts called alveoli. They take materials from the blood and turn them into milk.

Once made, the milk is stored inside the milk cavity of the alveolus. Just before the cow is milked, the farmer stimulates the udder by cleaning the teats. Alveoli squeeze the milk into a larger storage area, the cistern, just above the teat.

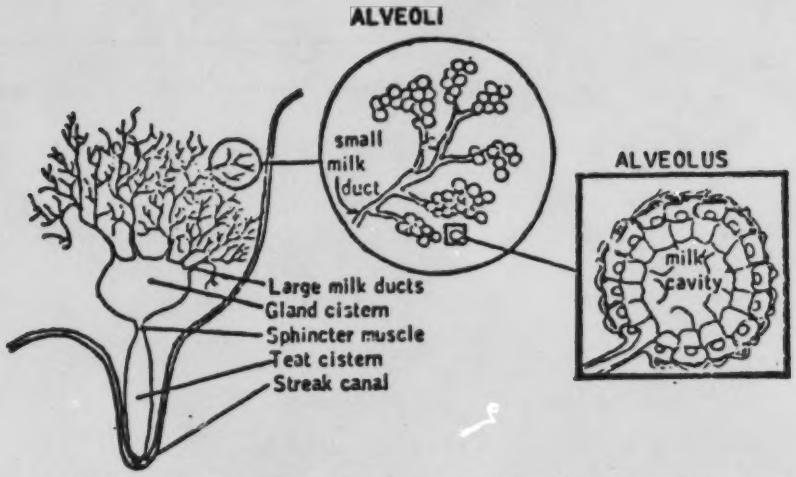


Fig. 1 Milk is produced and stored in the alveoli. By action on the muscle-like cells surrounding the alveoli, the hormone, oxytocin, forces milk into the large ducts and cisterns of the udder. At milking time, it passes through the streak canal. (Drawing by Caren Carney)

The udder had four cisterns,each one of them drained by a single teat through the streak canal.

Milking begins with cleaning the teats with warm water (c 40°C) and drying them with a clean cloth. In a very short time after, the milk is "let down," which means moved into the cistern.

Then the milk must be drawn out quickly - within 3.5 minutes. The handler briskly attaches four teat cups and draws out the milk. When he notices that just about all the milk is out, he massages the udder on the underside while pulling a little on the teat cups. This is called stripping. Massaging causes the last bit of milk to leave the udder; the teat cups are pushed down so that they don't climb up too high on the teats.

Cows are not milked year-round. Usually they are milked 305 days and then "dried" for eight to ten weeks. Milking typically starts at calving time, continues for 305 days, and then, eight to ten weeks before calving, stops abruptly.

Drying does not hurt the cow, even when done suddenly. It is actually very helpful. It allows the cow to build up body stores drained away by milking, and lets her give her energy to the growing calf. In addition she is fed a lot more grain than usual to keep up her strength.

Usually, cows are milked twice daily. If they are milked more often, say three times a day, production goes up only slightly - about 18 percent. That is not very much when you think of how much work goes into each milking.

Accurate records are kept of how much milk each cow produces. At the end of each milking period, called lactation, the cow's performance is evaluated. Records passed on to government computers show what the cow would have produced in 305 days of milking whether the actual number of days was more or less.

Learning Activity J

Respond to each of the following:

1. What organ produces the cow's milk?

2. How many milk storage chambers does a cow have?

3. Why does a cow have four teats?

4. What parts of the udder produce and store milk?

5. Where do the materials that milk is made from come from?

6. What happens inside the alveoli when the handler washes the teats?

7. Where does the milk go when that happens?

8. What is the process in questions 6 and 7 called?

9. Describe stripping.

10. What does stripping accomplish?

11. How often is a cow milked daily?

12. How many days a year is a typical cow milked?

13. Show the cow's milking cycle on the chart on page 6.

IV. Culling

The farmer wants his herd to produce as many calves and as much milk as possible. If there are a few cows that are low producers he gets rid of them. This job is called culling, and takes about 20% of the herd away to market every year.

The single most important thing that the farmer looks for is whether a cow is easily bred and produces a calf every year. If a cow misses a year, instead of producing a calf, she will grow larger and will need more food than the others. Also, she will cost money because there is no calf to ship to market.

A cow that does not breed easily, or even one that has difficulty in giving birth, is sure to be culled from the herd.

The second most important characteristic is milk production. If low producers are eliminated and replaced with better ones, the herd's production will go up.

But when looking at the production figures, the farmer has to consider that a cow's annual output increases as the years go by. When a cow reaches six to eight years of time since her first milking, she produces more than at any other time. A cow in her first year cannot be compared with a cow in her seventh year unless an age equivalent is calculated.

Cows can be culled for being hard milkers, kicking handlers, being prone to disease and many similar factors. But the main ones are difficulty in breeding and low milk production.

Learning Activity K

Select the cows that should be culled from the Edith Rogers Dairy Herd.

Method: 1. Calculate the number of cows that should be culled (20% of the total).

The number of cows is: ___

2. Identify the cows that have breeding problems. This is done by calculating the number of months and days it takes to breed each one. For cows that have not been bred, use November 12, 1980 as the breeding date.

		year	Mos.	Days
Example:	Cow no. 2 Breeding Date:	1980	06	22
	Subtract Calving Date:	1980	04	23
		0000	01	29

Cow number 2 was bred in one month and 29 days.

3. Calculate the number of months and days it took each cow in the herd to breed. Record these figures on the table on page 14.

4. State, from your results, which two cows have the worst breeding records.

They are: cow number ___ and ___.

*When borrowing in subtraction, consider each month as having 30 days. Your teacher will show you how this is done.

Cow Number	Time Between Calving and Breeding		Cow Number	Time Between Calving and Breeding	
	Months	Days		Months	Days
1			14		
2			15		
3			16		
4			17		
5			18		
6			19		
7			20		
8			21		
9			22		
10			23		
11			24		
12			25		
13					

5. Calculate the milk production of each cow. The 305 day average can be calculated by multiplying the number of kg produced by the factor next to the number of days in milk. The table is below, with an example of the calculations following.

Number of Days in Milk	Factor	Number of Days in Milk	Factor
120	2.27	240	1.18
130	2.01	250	1.16
140	1.97	260	1.13
150	1.84	270	1.10
160	1.71	280	1.07
170	1.58	290	1.04
180	1.45	300	1.01
190	1.42	310	0.98
200	1.39	320	0.96
210	1.30	330	0.94
220	1.28	340	0.91
230	1.23	350	0.89

Example: Cow number 1 produced 4793 kg of milk in 297 days.

The amount of milk it would produce in 305 days is:
(Use closest factor in each case.)

4793kg x 1.01 = 5022.73kg

Cow Number	305-day Average Milk Production	Age-rated Milk Production	Cow Number	305-day Average Milk Production	Age-rated Milk Production
1			14		
2			15		
3			16		
4			17		
5			18		
6			19		
7			20		
8			21		
9			22		
10			23		
11			24		
12			25		
13					

6. Compare the milk production of each cow. To do this you must consider that young cows do not give as much milk as older ones, but may become excellent producers just the same. To compare their production levels properly one must multiply it by an age conversion factor. Instead of using their real ages, lactation numbers may be used.

   Calculate milk production for each cow, multiplying her 305-day average by the age conversion factors.

   Example: Cow no. 2 305-day average - 5022.73kg
   lactation number 5

   305-day average x conv. factor = production

   5022.73kg x 1.02 = 5123.1846kg

AGE CONVERSION FACTORS

(Based on 305-day production and lactation number.)

Lactation Number	Conversion Factors
1	1.35
2	1.28
3	1.25
4	1.06
5	1.02
6	1.00
7	1.00
8	1.00

7. Enter the results on the table under "Age-rated milk production."

8. Identify the cows with the worst milk-production records.

   The three worst producers are: cows ___, ___ and ___.

V. Visit to a Dairy Farm

The dairy farm we will visit is typical of small operations around Edmonton. The herd consists of 35 cows, a bull, and some replacement stock. Market milk only is produced, and conditions are very clean, especially in the milkhouse, where milk and milking-equipment is stored.

The main building is a large barn with a concrete floor and stanchions along the wall. Cows have their heads in the stanchions and face the walls. Their posteriors are next to a gutter with moveable bottom, barn cleaners, and there is a walkway down the center of the barn between the rows of cows. Overhead is a pipeline system that leads to a separate milk-receiving building. At one end of the barn there are several calving boxes and calving pens.

The milkhouse, which is attached to the barn, has a large milk-storage tank, pumps that operate the vacuum lines, and motors to cool and stir the milk inside. There is running water to clean milking equipment and various cleaners used for sterilization.

The barn has large, sliding doors on both sides. One leads to pasture, the other into the farmyard. The barn is on higher ground than the rest of the farm buildings.

Learning Activity L

Your teacher will take you to a dairy farm. When you are there you should follow the outline below.

Overview

1. Sketch the farm's buildings on an outline plan. Show the fence lines and watering pond.
2. Why is the barn located on the elevated part of land?
3. About how much land is involved in this dairy operation?
4. How many cows are there? How many bulls? How many calves?

Milking

5. What is done to prepare the cow for milking?
6. How soon after preparation is the cow milked?
7. What is done to finish off milking? What is this called?

Measurements

8. Measure the girth of a cow at her withers. Use a table to estimate her weight: girth: _____ cm weight: _____ kg
9. Measure the length of a stanchion. Why does its length have to be exact? length: _____ m

10. Read the milk level on the dipstick in the storage tank. Read the quantity of milk from a chart on the wall.
milk level: _____ Amount of milk: _____ l

General Questions to Ask the Farmer

11. What is silage?
12. Do his cows have different diets? Why?
13. What is the main food of cows?
14. What is the most important nutrient for milk production?
15. What does he do with the calves?
16. How are calves marketed? How much are they worth?
17. Does he have a good bull? How does he know?
18. How much milk does the average cow produce per day?
19. What cattle diseases does he have to watch for and how are they treated?

DISASTERS

Developed By
George W. Smith

An Interdisciplinary Unit in Social Studies, Science and Language Arts

STUDENT HANDBOOK - GRADE 7

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1. Rationale

2. Description of Activities 1-5

3. Activity #1
   - Instructions
   - Headlines
   - Dichotomous keys

4. Activity 1 A - groupings

DISASTERS

STUDENT HANDBOOK

RATIONALE

Junior high students have difficulty discerning what is and what is not really important to their lives. Some things which are not very serious are magnified into major problems by their imaginative minds and things which seriously affect the quality of their life are of little concern.

Newspapers are full of disasters devoted to the negative aspects of life herein called disasters. It seems that if all these negative articles plus the sports, leisure and advertisements are removed from the paper only the comics will be left. . ˜ these disaster stories are examined and evaluated in detail by students, the students may be educated as to the causes and effects of these disasters. If the students are allowed to form their own opinions about the severity of a variety of disasters, they may then be in a position to rank these disasters in terms of importance. Although each student will probably rank some individual disasters differently, all students should be able to comprehend that there is a need for improvement in our world today.

ACTIVITIES

Activity #1

From a large supply of newspapers (you) select one and place (your) name on the front cover in a prominent position. Then read the paper from cover to cover. Select 25 different headlines from different sections of the paper and place them on page 139 of this handout. Then reread each of the articles with a view in mind of choosing 8 articles which will fit a dichotomous key. A dichotomous key is a schematic drawing which separates subject matter into two parts and it describes the kind of choices you make in using such a key. Complete two keys one of which is a master complete with headline and one blank so that another student can test its accuracy.

Activity #1 A

From the same 8 articles used in the dichotomous key, you will determine whether each article is social, economic or political in content. List the article's headline under the appropriate column on page 139 with a brief explanation on why you chose that grouping. If the article is equally applicable to more than one grouping, then list it in those groupings complete with explanation. Remember that social corresponds to mental needs (Mental needs are those needs that affect a person's mental state. If they are not satisfied, the person with the need will feel some unpleasant mental sensation); economic corresponds to satisfying physical needs (Physical needs are those that affect the body. If they are not satisfied, the person with the need will feel some unpleasant physical sensation.); political corresponds to satisfying group needs (Group needs are needs that affect how well groups operate. If they are not satisfied, the group with the need will have trouble staying together.).

Activity #2

From a list of books supplied with this unit you will choose a book about disaster(s) and write a report on the disaster(s) discussed in the book. You will be given three reading periods to begin your search for the book and enough reading time to allow a good start on the book. You will be given one period to write the book report at the conclusion of this activity. Reading is an essential skill at the grade 7 level and this activity should improve your skills both in reading and writing.

Activity #3

You will be put in a group. Your group will search your newspapers for a disaster article that motivates you to want to assist the victim(s) of the disaster. You may raise money, collect food or clothes, etc. Writing letters of a positive nature is also very acceptable. It is hoped you gain more insight in disasters and a warm feeling about yourself by doing this activity.

Activity #4

You will use the library to write a report titled 'Disasters" A Preventative Approach'. You have to choose a disaster not used in either activity #2 or #3. You must be practical in your solutions! The major purpose is to show you that there are ways to make a better life in this world. You will give your report orally with a text of your talk being handed in to the teacher at the conclusion.

Activity #5

You will go on a field trip to the Edmonton Journal to find out how a paper is produced.

Activity #1 Dichotomous Key ____ Disaster Class ____ Total ____

According to the dictionary what is a 'disaster'?

From the large supply of newspapers provided, choose one. Place your name in large letters on the front page. What date have you chosen? What is the name of the paper? How many pages does it contain?

This paper must be kept in good condition. Newspapers are not made of high quality paper so be very careful not to tear parts of it.

Read the paper from cover to cover reading every article except the advertising. Approximately how long did it take you to read this edition? ____

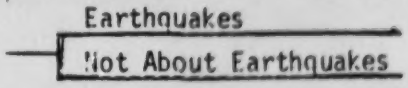
Select 5 different headlines from pages 1-5.
Select 5 different headlines from pages 6-10.
Select 5 different headlines from pages 11-20.
Select 5 different headlines from pages 21-40.
Select 5 different headlines from page 41 to the end of the paper.
Fill in the headlines on the following sheet.

Activity 1A

Reread the stories associated with the headlines.

Choose 8 articles which best fit your interpretation of 'disaster' and which will be able to fit a dichotomous key (see key). In choosing the articles you are using your ranking skills which were taught in Social Studies.

Make up a master dichotomous key that includes the headlines on it and the same key without the headlines. You are not allowed to use words of the headlines in the key. For instance,"Earthquakes strike California" the key cannot mention such things as



You will be evaluated on your dichotomous keys and your groupings of the disasters!

Activity #1
Place the headlines here giving the page number on which they are found.

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.
21.
22.
23.
24.
25.

Place a * next to the headlines you choose as one of the 8 articles to key. Before the headlines also put a code letter (known only to you) that you will use on the keys. Remember your code letter only goes on one key and both the headline and the code number goes on your master copy.
Place a S (social) or a E (economic) or a P (political) after the 8 headlines. Explain why each article is S, E, or P on the next page. You should be brief but correct as to the reasons.

Activity #1A Groupings

SOCIAL	ECONOMIC	POLITICAL
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Name_____

Class_____

Articles drawn from

Page___

Page___

Page___

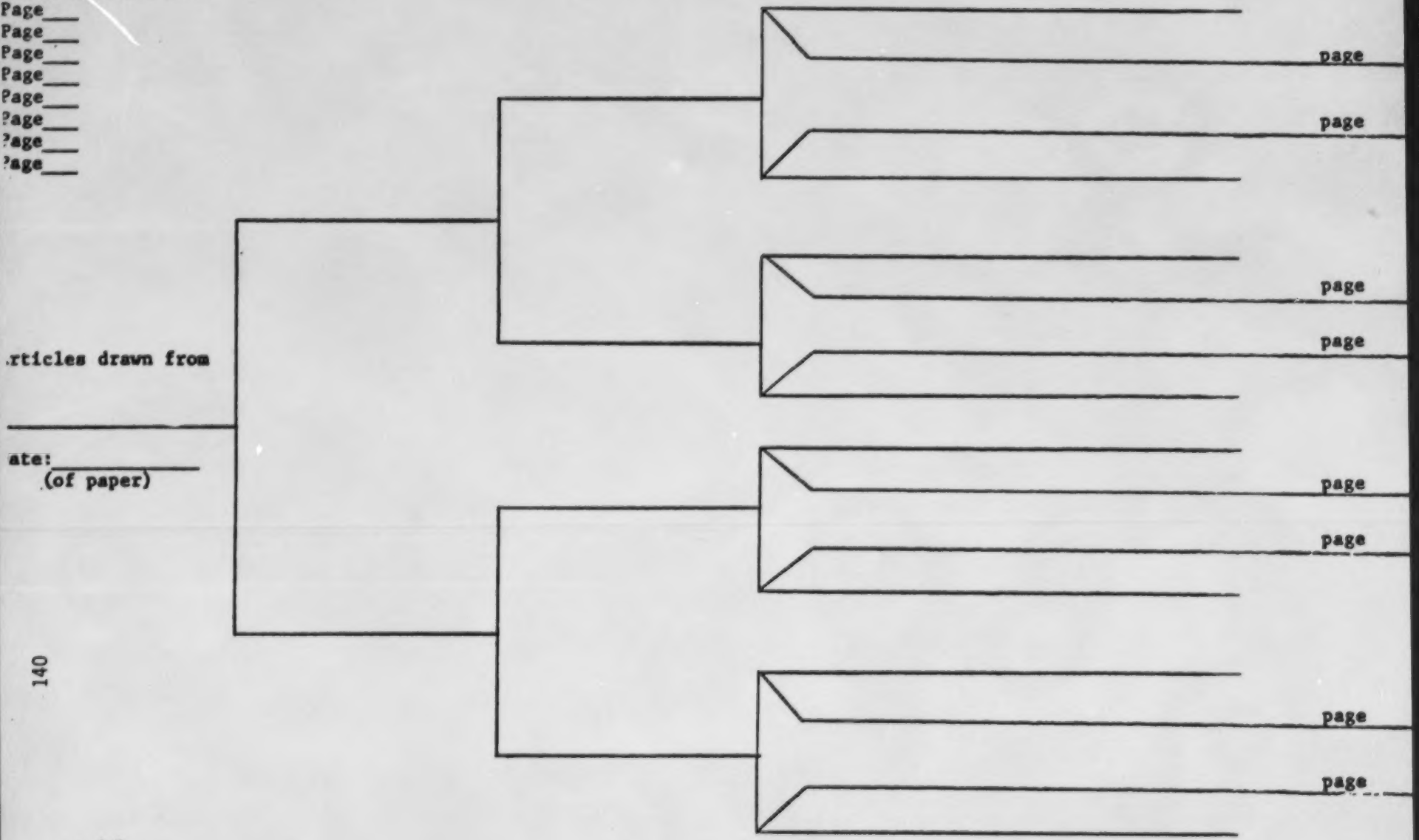
Page___

Page___

Page___

Page___

Page___



rticles drawn from

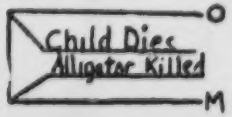
ate:_____
(of paper)

140

148

Use page number only for the master copy

Person checking the key puts headline inside



149

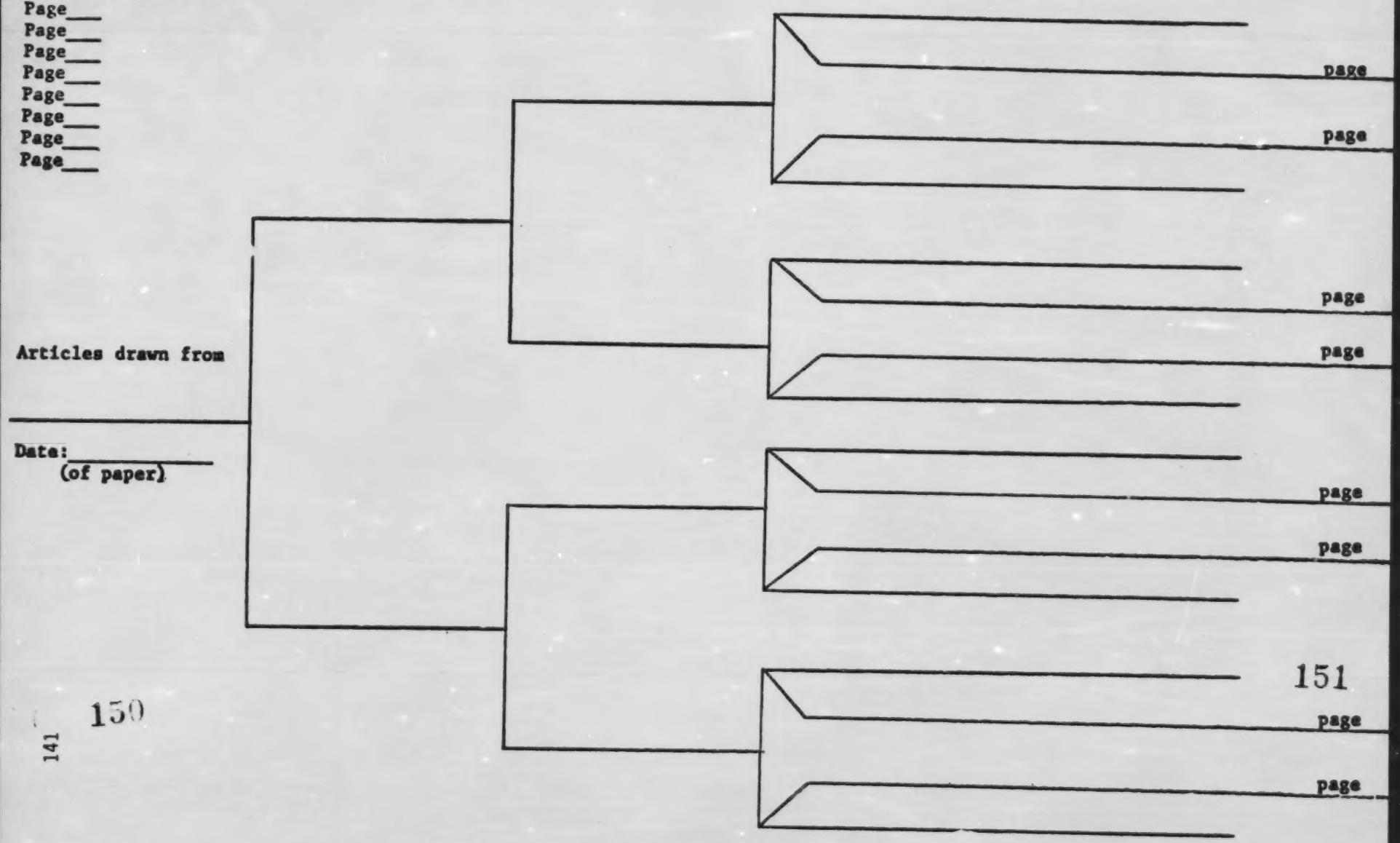
Name_____

Class_____

Articles drawn from
Page___
Page___
Page___
Page___
Page___
Page___
Page___
Page___

Articles drawn from

Date:_____
(of paper)

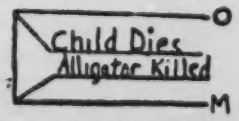


130

141

Use page number only for the master copy

Person checking the key puts headline inside



MULTICULTURALISM

Developed By

Garry Douglas

An Interdisciplinary Unit in Social Studies and Language Arts

STUDENT HANDBOOK - GRADE 7

Table of Contents

1. Describing Emotions
2. 1740, The French - film, activities
3. The Scots - background, film, activities
4. Debating
5. 1847, The Irish - film, activities
6. 1927, The Ukrainians- film, activities
7. 1911, Denmark - film, activities
8. Voice of the Fugitive - film
9. Strangers at the Door - film
10. Culminating Activities

MULTICULTURALISM

STUDENT HANDBOOK

PART ONE

TOPIC: Describing Emotions

ACTIVITY: After discussion write a paragraph on the topic "How I Felt When I First Started Grade Seven".

Be prepared to read your paragraph orally.

PART TWO

TOPIC: Show film "1740, The French".

TOPIC: Questions about "1740, The French".
Answer in complete sentences. Explain in detail.

1. Why did Nicholas first come to New France? _____
2. Did Nicholas like New France at first? Explain._____
3. How did Gagnon convince De Lugny to go on a fur trading mission? __
4. Describe some of the equipment that De Lugny gathers to take on his mission.__
5. What did the other men on the expedition think of De Lugny at first? (Did they like him? Explain _____
6. Why did Nicholas De Lugny lag behind the fur trading party? _____
7. Describe how Nicholas was rescued by his fellow travellers. _____
8. What did Nicholas think of the food the other men were eating on the trip? ____
9. What did the men do for Nicholas when he was sick? _____
10. Eventually the group of fur traders encountered a burning house. Describe what the scene looked like and tell what the fur traders did for the unfortunate victims of the fire. _____
11. When the group met an Indian woman what happened to the attitude of the men towards each other? Why? _____

EMOTIONS

Tell what thoughts might have been going through De Lugny's mind in each of the following situations.

A. When in the rowboat at the beinning of the show.
B. When he fell in the water from the boat.
C. When he first saw Marie - Catherine.
D. When he got sick.
E. When he became well.
F. When trading furs at the trading post.
G. When he returned from his trip.

ART ASSIGNMENT

Pick one of the situations from the exercise "Emotions". On a 8x11 sheet, using only a pencil, draw a picture in which the emotions of De Lugny felt will be illustrated.

For example, can you show the look of De Lugny's face when he fell in the water.

Make sure you tell which you are drawing on the back of your sheet.

TOPICS FOR PARAGRAPHS

1. What to wear on a fur trading trip.
2. The beauty of early French Canada.
3. How to bargain for a good price when you are a fur trader.
4. Why I liked (or disliked) the show "1740, The French".

LIBRARY RESEARCH

The following questions are to be answered by looking in the Library for information.

1. In what year did Jacques Cartier come to North America?
2. If you were a seigneur in New France, what would your job be?
3. Why did the French fight with the Iroquois?
4. Tell about the "Coureur de Bois".
5. Why is the date 1760 important in the history of the French in North America? Explain.
6. Why was the date 1774 important to the French in North America?

SHORT ESSAY (up to one page)

Nicholas De Lugny eventually married Marie - Catherine and stayed in New France.

Give your opinion why Nicholas decided not to go back to France. Was the only reason the fact that he loved Marie - Catherine?

Support your argument with some of your observations.

PART THREE

TOPIC: Background preparation before watching the film "The Scots".

INSTRUCTIONS: Students are to complete the questions by doing research either in the library or as homework.

RESEARCH QUESTIONS - THE INDUSTRIAL REVOLUTION

1. Look up the meaning of industrial in the dictionary and copy the meaning.
2. Look up the meaning of revolution in the dictionary and copy the meaning you think applies.
3. What do you think the term "industrial revolution" means?
4. About what time (date?) in history did the Industrial Revolution begin?
5. Find out who Charles Dickens was and tell what he thought about the Industrial Revolution.
6. Locate one of Charles Dickens' books and copy a few sentences to show some of the conditions children had to work in. You might look in such books as "Hardtimes" or "Oliver Twist".
7. What were the names of the "provinces" which joined together in 1867 to create the nation of Canada?
8. Locate a map of Canada in 1867. Sketch a copy neatly on the next page. Take care to be neat and accurate.

Map of Canada 1867.

9. Find at least one reason why the provinces wanted to join together to become Canada. Explain.
10. The American Revolution happened in 1776. Who were the Americans upset with?
11. Persons who were loyal to Great Britain came North after 1776. Where did they settle?
12. What was the nationality of most people who lived in "Canada" before 1776?

TOPIC: Watch the film "The Scots"

TOPIC: Exercises on "The Scots"

1. Which of the following words could be used to describe John Symons. Underline the words you choose. You may have to use your dictionary.

intelligent	stubborn	pugnacious	indignant	grateful
kind	superficial	loving	strict	diligent
remorseful	soft	creative	sad	wise
hard	humorous	tenacious		

2. Write a paragraph on each of the following topics. Include your opinions in each paragraph.
   A. John Symons' skill as an axeman.
   B. John Symons' attitude towards unemployment.
   C. Why John Symons became a rich man.

ART ASSIGNMENT

Draw a tombstone. On it write what you would like to have people say about you after you die. Take special care with your drawing and colour it well.

MY TOMBSTONE

STORY TELLING

The story of John Symons was told using "flashbacks". Mr. Symons kept remembering the past and "flashing back". Did you think this technique of story telling was effective? Why or why not?

You are walking to school with a friend. Try using the flashback style of storytelling and write about some of your experiences in grade six and at the same time describing interesting things you see on your way to school!

PART FOUR

TOPIC: Learning How to Debate

THE DEBATE

A DEBATE is a discussion held between two persons or teams using special rules which are followed quite closely. Only one topic is discussed. This topic is introduced by means of a resolution.

A resolution is like an opinion and the debating teams that agree with that opinion are said to be the "PRO" side. Teams that disagree with the opinion (resolution) are said to be the "CON" side.

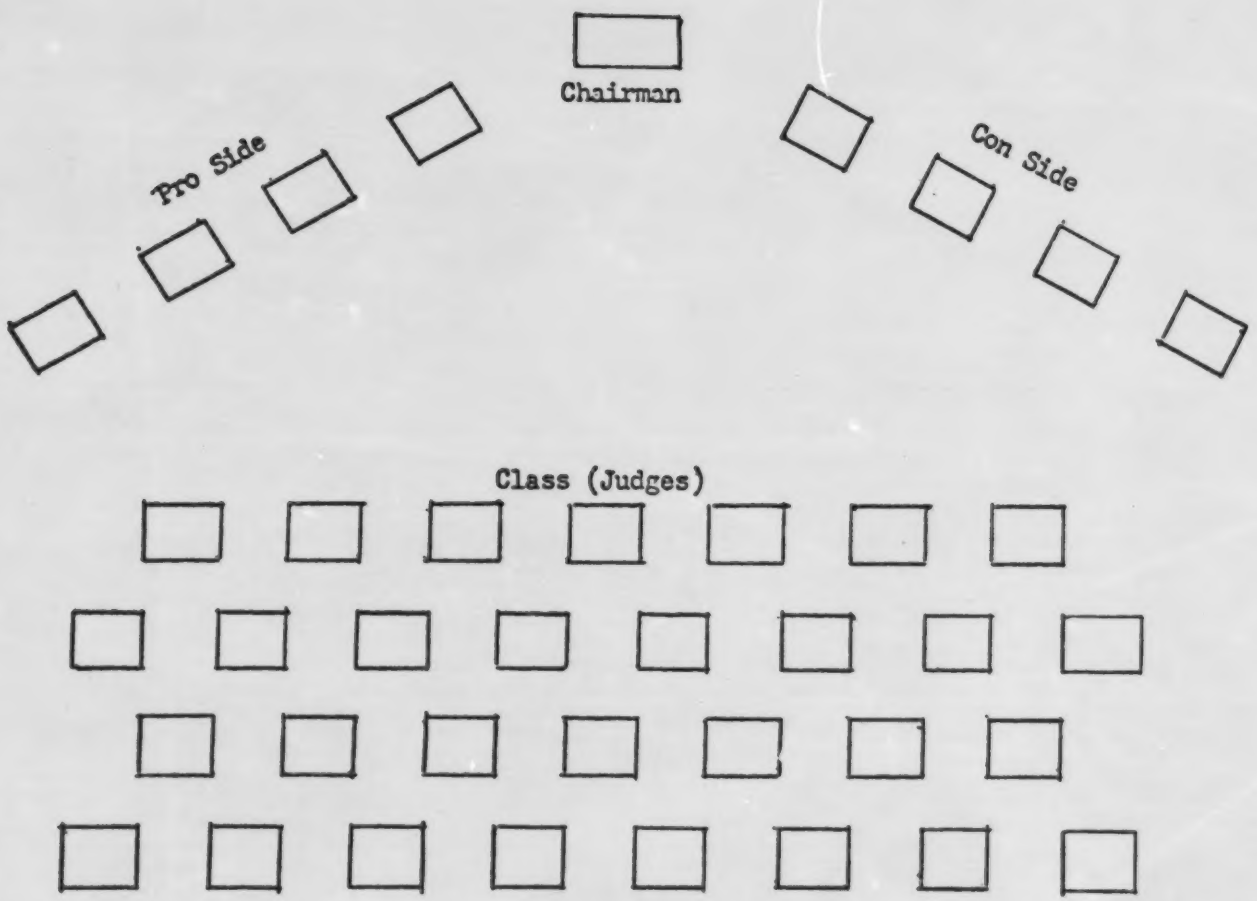
These statements are "resolutions".

RESOLVED: Teenagers should not start dating till age 19.

RESOLVED: The Liberal party needs a new leader.

RESOLVED: It is better to give than to receive.

PHYSICAL SET-UP FOR DEBATING



In each debate, four people will be on the Pro side and four people will be on the Con side.

DEBATE PROCEDURES

1. Each member of the con side and each member of the pro side will neatly write an opening statement about ½ a page in length. They will discuss the topic together first so they will not duplicate each others work.

2. The debate begins when the opening statements have been neatly written.

3. The opening statements are read orally, first one statement from one side, then a statement from the other side until all opening statements are read.

4. During the time opening statements are being read members of the debating teams should be jotting down points they disagree with so these points can be discussed in REBUTTAL.

5. When opening statements have been read, rebuttals begin. Debaters may speak (after being recognized by the chairman) in <u>any</u> order. It may be convenient to limit each debater to three rebuttals. This should be decided ahead of time.

6. When the rebuttals are over, each team will pick one member to be a spokesman for the group and briefly summarize their team's point of view.

7. The team that wins is the team with the most votes from the class. Class members <u>may not vote</u> for a winner unless they keep a scoresheet.

SCORESHEET

RESOLUTION (students write in the resolution)

OPENING STATEMENTS

PRO	CON
Give 3 points for each super new idea Give 2 points for a good new idea Give 1 point for a fair new idea Give 0 points for a poor idea Show points awarded by counting like this: 𝍸 𝍸 𝍸 ///	Use the same scoring method as pro

REBUTTALS

(score the same method as opening statements)

𝍸 //	𝍸 𝍸 𝍸 /

SUMMARY

Maximum 5 points for a summary	same as for pro

SCORESHEET

RESOLUTION _____

_____

OPENING STATEMENTS

PRO	CON

REBUTTALS

PRO	CON

SUMMARY

PRO	CON

TOTAL SCORE: PRO

TOTAL SCORE: CON

TOPIC: Practise Debate Topics

1. Resolved: that homework be abolished
2. Resolved: that all teenagers be given the right to vote
3. Resolved: that pop music is a pain in the neck
4. Resolved: that the world is flat
5. Resolved: that oranges are delicious
6. Resolved: that larger classes would be better especially in Junior High School
7. Resolved: that beauty is only skin deep
8. Resolved: that debates are a good way to reach the truth

PART FIVE

TOPIC: Watch the film "1847, The Irish"

TOPIC: Debate topics based on the T.V. production, "The Irish."

1. Resolved: that Mary and James make a mistake when they dicided to go to Canada.
2. Resolved: that the treatment given cholera victims was cruel and unjust.
3. Resolved: that James should not have gone to Canada by himself. He should have taken his wife and children at the same time or not have gone at all.
4. Resolved: in our present day world there are not more adventures to undertake which could compare with the adventures of James and Mary.

TOPIC: A small research project for vocabulary building
Writing paragraphs

Find the meaning of the following words. Give the meaning by explaining using your own words.

Famine Poverty Orangemen Protestant Roman Catholic Emigrant
Immigrant Cholera Typhus

PARAGRAPH ASSIGNMENTS

1. Why do you think some people disliked the Irish?
2. Which part of the film on the Irish did you like the most? Why? Explain in detail.

PART SIX

TOPIC: Show the film "1927 - The Ukrainians"

TOPIC: A character Study - Ivan Lypa

INSTRUCTIONS: Give examples from the film that show Ivan Lypa possessed or did not possess each characteristic.

Courage	Humor	Stubborness	Determination	Intelligence	Jealousy
Prejudice	Sadness	Patience	Ingenuity	Temper	Loyalty
Flexibility		Wisdom			

TOPIC: Writing a new ending for the film "1927 - The Ukrainians"

ASSIGNMENT: Change the ending of the story. To do so you may wish to alter other events not near the end of the film. For example you may keep Hanya alive if you wish. Write the story as if you were telling it to your friends.

Take up to two pages for your new ending.

Don't forget to include details about what is happening, or your ending will not be interesting.

"1927 - A New Ending

PART SEVEN

TOPIC: Show the film "1911 - Denmark"

TOPIC: Questions about the film "1911 - Denmark"

1. Why did Hans come to Canada?
2. Describe the clothing Camilla wore when she arrived in New Brunswick.
3. Why did Hans's brother lie to him in his letters?
4. Why was Hans so patient with Camilla?
5. Do you think Camilla hated the people she had to share a house with? Explain.
6. It appeared that Mr. Fraser was an unreasonable man. Was he? Explain.
7. Write two or three paragraphs comparing Camilla and Mr. Lypa (the Ukrainians). Tell how they were alike and how they were different.

PART EIGHT

TOPIC: Watch the film - "Voice of the Fugitive"

PART NINE

TOPIC: Watch the film - "Strangers at the Door" (immigrants)

PART TEN

After viewing the Newcomers series and the two films, "Voice of the Fugitive" and "Strangers at the Door", it should be obvious to you that Canada is made up of people from all over the world.

Should "we" as Canadians let people come here from other lands?

Should we stop limiting the number of people from other lands who enter Canada?
Should we encourage people to come here from other lands?
Write your opinions on two pages.

PLANTS-RATE, RATIO and PERCENTAGE

Developed By
Cary Lilley

An Interdisciplinary Unit in Science, Mathematics and Language Arts

STUDENT HANDBOOK - GRADE 7

Table of Contents

1. Plants
2. Plant Growth Chart
3. The Seed
4. The Root
5. The Stem
6. The Leaf
7. The Flower
8. Vocabulary

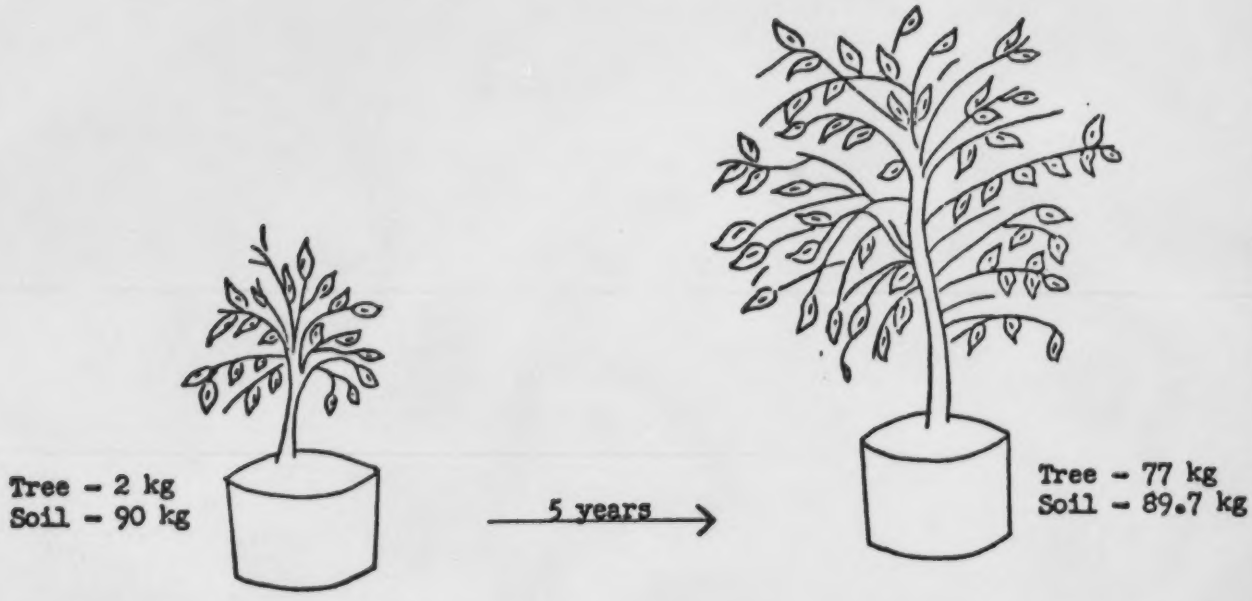
PLANTS-RATE, RATIO and PERCENTAGE

STUDENT HANDBOOK

PLANTS

More than three centuries ago, Jean Baptiste Van Helmont performed an interesting experiment. He took a clay pot and filled it with 90 kg of oven-dried soil. The soil was then soaked with water. A small willow tree weighing 2 kg was planted in the soil.

As the months passed, the tree increased in height and thickness. For five years Van Helmont watered the willow tree and watched it grow. Then he removed the tree and weighed it. He observed that the 2 kg willow tree had increased in weight to 77 kg. Next, Van Helmont dried and weighed the soil in the pot. To his surprise, he found that the soil weighed only 0.3 kg less than the original weight of 90 kg.



Van Helmont concluded that the increased mass and weight of the tree did not come from the soil, but rather from the water that was added to the soil during the five years.

In this activity we are going to recreate Van Helmont's experiment. We will also grow some bean plants for later study.

Materials: soil, flower pot, bean seeds, triple beam balance, flat sticks for markers.

Procedure: Day 1

1. Get a triple beam balance and zero it.

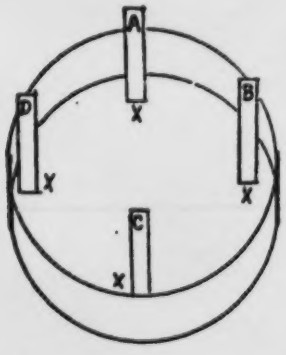
2. Weigh the flower pot. _____ grams.
(Place this weight in the table provided.)

3. Take the flower pot and fill it with soil. Pack it firmly. Now weigh it. _____ grams. Place this weight in the data table provided.

4. Calculate the weight of the soil.
(weight of pot and soil - weight of pot)

5. Weigh 4 bean seeds individually.
Seed A. _____ gm
Seed B. _____ gm
Seed C. _____ gm
Seed D. _____ gm
Place their weights in the data table provided.

6. Plant the bean seeds and put a stick, labeled to identify the bean beside it.



7. Add 100 mls of water evenly over the soil. Since 1 ml of water weighs 1 gm, the total weight of the water is _____ gms. Place this in the data table.

8. Put your name on the flower pot and bring it up to the front.

DATA SHEET

1.

Weight of flower pot and soil	
Weight of pot	
Weight of soil	

2. Weight of bean seeds

Seed A	
Seed B	
Seed C	
Seed D	

3. Weight of water added each time the soil is watered.

First Watering	
Second Watering	
Third Watering	
Fourth Watering	
Fifth Watering	

Total Weight of Water Added _____

Final Plant weigh in.

1. Carefully remove your plant from the soil. (Be careful to get as much of the roots as possible.) Clean the roots off and save all the soil.
2. Weigh the plant.
3. Take the soil and give it to your instructor. He will dry it out.
4. Why is it important to have the soil dried?
5. Weigh the soil.

To be completed at the end of the experiment:

weight of plant _____ gm (A)

weight of seed _____ gm (B)

increase in weight _____ gm

% increase: ratio of plant weight after to weight of seed before

weight of soil before _____ gm (A)

weight of soil now _____ gm (B)

△ in weight _____ gm

% weight loss: ratio of weight after to weight before

1. What accounts for weight gain in the plant?
2. How can you explain the weight loss in the soil?
3. Give some sources of experimental error.

PLANT GROWTH CHART

1. Number of seeds germinated:
   (a) Seeds in my group - _____
   (b) Total number in class - _____

   Percentage of seeds germinated:
   (a) in my group _____ % (show your work)
   (b) in the class _____ % (show your work)

2. Plant Growth. This chart should be filled in daily.

Day	Height (in cm)	Observations	Growth rate in cm/day
1			
2			
3			
4			
5			
6			
7 - 15			

GRAPHING

1. Convert the growth rate from the chart into ordered pairs. Write them below.

2. Graph the order pairs.

THE SEED

The seed is composed of four main structures. A tough seed coat covers the seed and is responsible for protecting the inner structures. Under the seed coat is the embryo which is a small structure that has the ability, under proper conditions, to develop into a plant. One end of the embryo will develop into the leaves and stem, the other end into the root system. The food supply for the embryo is the endosperm. Depending on the type of plant, there may be one or two cotyledons. These cotyledons break down and store the endosperm for the embryo.

In some cases, such as the bean seed, the cotyledons have enlarged because they have broken down the endosperm (which has disappeared) and store it until it is used. In the corn seed, the endosperm is very large while the single cotyledon is smaller. The break down of the endosperm by the cotyledon in the corn does not occur until the embryo has germinated and is growing.

Plant seeds with one cotyledon are called monocotyledon (monocots); plant seeds with two cotyledons are called dicotyledon (dicots).

Germination must take place before the embryo can develop into a young growing plant. Germination is a process which activates or starts the embryo growing. The first step in germination is marked by the seed absorbing water. This causes the seed coat to break open. The embryo's root now pushed its way out and down into the soil. The young stem is also growing very quickly now and soon pushes its way up to break through the surface of the soil. Attached to the stem one can observe the cotyledon which supplies the plant with food until the leaves develop and it can produce its own.

In this activity you will investigate structure of the seed.

Materials: 1 bean seed, 1 corn seed, magnifying lens, scalpel

Procedure:

1. Take the bean seed and carefully cut through the seed coat with the scalpel. Peel off the seed coat.

   What is the function of the seed coat?

2. Observe a white or cream colored solid which lies below the seed coat in the bean seed.

   What is this structure called? What is its function?

3. Gently pull the cotelydons apart (they should divide easily). At one end you should observe a structure which, with a lot of imagination, looks like a small curled up plant.

   What is this structure named? What is its function?

Can you see which end will develop into the stem and leaves, and which end will develop into the root?

4. Draw a diagram of the seed as it looks in step 3 above. Label the cotyledon and the embryo.

   Draw a close-up of the embryo as well.

Seed Dissection #2 - The Corn Seed

The corn seed is different in structure compared to the bean seed. First of all, it is a monocotyledon. Secondly, the endosperm has not been broken down by the cotyledon and can be easily seen. Remember, in the bean seed, the cotyledons had broken down and stored the endosperm. This process does not occur in the corn seed until germination has taken place. The cotyledon in the corn seed is an area at the base and toward the side of the seed. It surrounds the embryo which is not as developed as the bean embryo.

Materials: corn kernel, scalpel, magnifying lens

Procedure:

1. Obtain a corn kernel.

   Draw the external view.

2. Cut through the seed coat. Find a whitish substance that fills most of the seed. What is this substance?

   What is its function?

3. At the base of the kernel you will see a whitish-grey, more solid structure which is roughly an egg shape. What do you think this is?

4. Draw the internal view of the corn seed.

THE ROOT

1. What are the four main parts of the seed? Give their functions.

2. Name two different kinds of seeds.

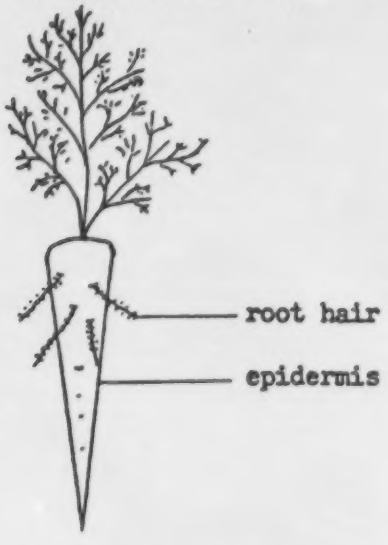
3. What is germination?

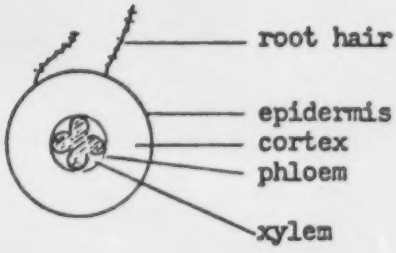
4. Name the steps involved in germination.

5. Give three differences between the bean and corn seeds.

The Root

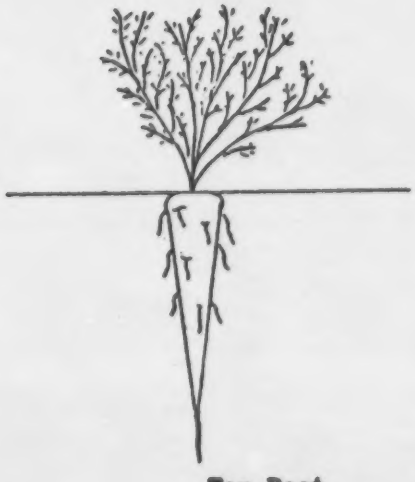
The root is composed of four main parts. The outer surface is covered by a tough epidermis which protects the root. Inside the epidermis we find a layer of tissue called the cortex. The cortex is responsible for storage of the food which the plant produces. The cortex is also the part which makes up most of the root. At the very center of the root is found the central cylinder. The central cylinder is composed of cells which join together to form tubes. These tubes run up the root and stem into the leaves. There are two types of tubes. One type, called xylem, is made of dead cells. Xylem transports water and minerals up the plant to the leaves. The other type is called phloem. Phloem is made up of living cells which transport food made in the leaves down to the stem and roots. Xylem cells are found usually in the center of the central cylinder; phloem cells on the outside. Phloem and xylem are the transportation system within the plant. Root hairs grow out of the epidermis into the soil. They are responsible for absorption of water and minerals.



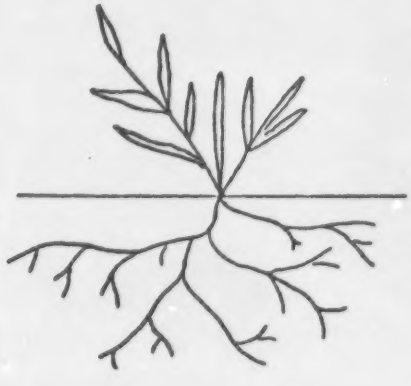


ROOT: Cross-Section

There are two types of roots based on their appearance. A root with one thick growth is called a tap root. A carrot or turnip is a good example of a tap root. Some plants have roots with many fibers that extend through the soil and form a type of net work. Grasses are examples of fibrous roots.



Tap Root



Fibrous Root

Growth in a root occurs at the tip. The root tip is covered with tough dead cells which protect the dividing cells beneath them. As the cells divide, the root gets longer and pushes into the ground. As the cortex cells reproduce the root grows in diameter (thickness).

There are three main functions which the root performs. It anchors and supports the plant. Water and minerals are absorbed by the root hairs and food produced by the plant is stored in the root. In some plants, the root is capable of reproducing the whole above ground plant if it is accidentally destroyed.

Questions:

1. List the four main parts of the root and give their functions.
2. What is the difference between phloem and xylem? Where are they found?
3. What is the difference between a tap root and a fibrous root?
4. List three functions of the root.

Dissection #3

Materials: carrot, scalpel, magnifying lens

Procedure:

1. Obtain a piece of carrot. Make a cross-section about 1 cm thick. Draw a diagram and label any parts you can from the background information.
2. From your carrot cut a piece out of the central cylinder and a piece which is only from the cortex. Eat the central cylinder and pay close attention to its taste. Now eat the cortex piece.

   Which piece tastes sweet? Why do you think it does?

THE STEM

The stem of a plant is the part of the plant that connects the roots to the leaves. In a tree this includes the trunk, branches, and twigs. The stem has many functions. Some of these functions are given below.

1. The leaves need sunlight to make food. They have to be supported above the ground and must be spread out so that each leaf will receive sunlight. The support and the spreading of the leaves is one of the main functions of the stem.
2. The stem also acts as a highway. Water and minerals come into the plant through the root. The leaves need these materials, since the food in a plant is made in the leaves. The root stores this food. The stem is therefore, a two-way highway. In the xylem water and minerals go up to the leaves, and in the phloem food is carried to the roots.
3. The stem may also be used by the plant as a food storehouse. The leaves sometimes make more food than the plant needs. When this happens the plant stores it in the stem.

In this investigation you will be learning how water and minerals make their way from the bottom of the stem to the leaves. You will also be looking a few other interesting things as you go.

Materials: two sticks of celery (one of the celery sticks has been sitting in colored water for a few hours, and the other one in water.)
hand lens
scalpel or
razor blade

Procedure:

1. Cut a 2 cm piece from the bottom of the celery stalk that has been sitting in plain water. Keep the small piece you have cut off.
2. Take a hand lens and look carefully at the raw end you made. In a house we use pipes to transport water. Can you see anything on the end that looks like the ends of pipes? If you can, draw all that you see.
3. Take the celery stalk that has been sitting in the colored water and compare it with the one that was sitting in plain water. Write down any differences that you might see between the two celery stalks.
4. One set of bean plants will now be watered with red colored water. At the end of the one week, what do you think the result will be?

THE LEAF

Attached to the stems of a plant are the leaves. The leaves are the most important part of the plant, for it is inside the cells of the leaves that photosynthesis takes place. A green pigment called chlorophyll, which is contained in the chloroplasts, changes carbon dioxide and water, using light energy, into carbohydrate molecules (energy).

The leaf also has other structures which aid this process:

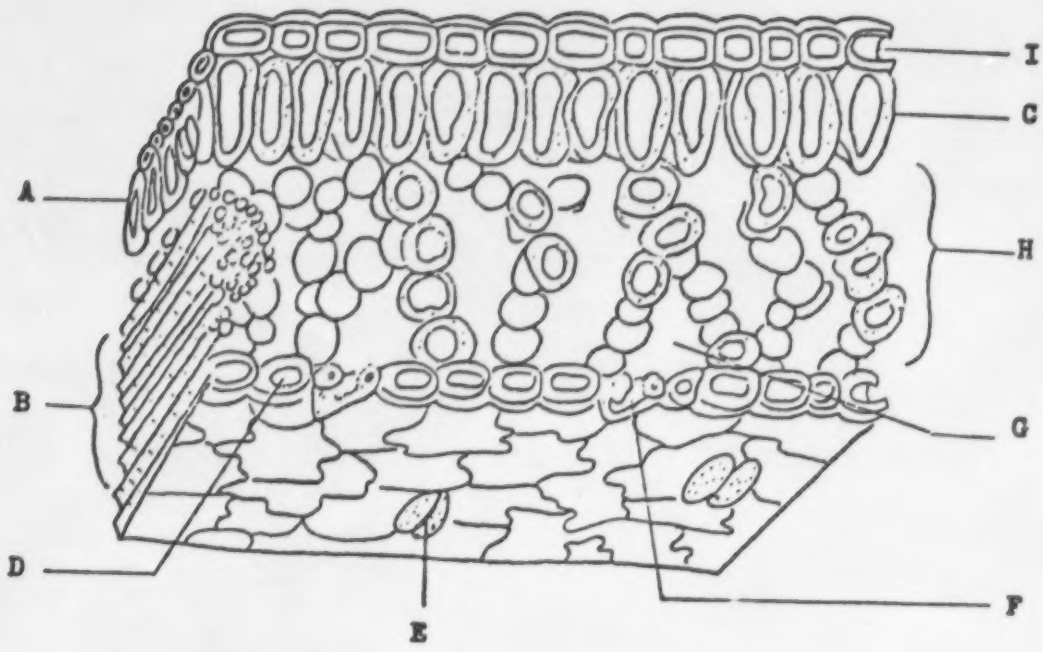
1. stomata - openings on the leaf (mostly the underside) which allow carbon dioxide (CO_2) and oxygen (O_2) in and out. Also the stomata let water out by transpiration.

2. veins - veins on the leaf transport water and minerals to the leaf and the products of photosynthesis (energy - carbohydrates) away from the leaf. A network of veins throughout the cell connects the leaf cells. The veins all join near the base of the leaf and join the vascular bundles of the stem.

Diagrams

1. Draw a leaf. Observe the veins closely. What are the veins made of?
2. With the microscope, observe the bottom (underside) of a leaf. Draw the stomata.
3. Take a small section of leaf and make a wet mount slide. Be sure to press the cover slip down firmly. Using medium (100x) magnification, draw and label one plant cell.

Leaf Anatomy



Background Information

The diagram given above is a cross-section through a green leaf. You should notice that there are a number of different types of cells in the leaf. Each of these cells has a specific function or use to the leaf. Use the reference books listed below to:

1. Label the diagram with the following structures:

   upper and lower epidermis
   palisade cells
   spongy cells
   guard cells
   stoma
   vascular tissue or xylem and phloem
   chloroplasts

2. Find and write down the functions of the parts listed below:
   upper epidermis
   lower epidermis
   spongy cells
   palisade cells
   guard cells
   stoma
   chloroplasts

REFERENCE BOOKS - Life- Its Forms and Changes
Life Science A Process Approach
Modern Biology

Materials: microscope, cross-section of a leaf

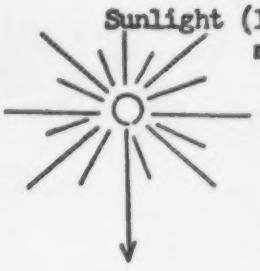
Procedure:

Using either low or middle power in a microscope, attempt to find the parts of the leave listed in your Background Information.

Photosynthesis and Respiration

Plants are very special organisms. They are the only things on earth capable of making their own food. They produce food molecules by a process called photosynthesis.

In Photosynthesis:



$$CO_2 + H_2O \xrightarrow[\text{chlorophyll}]{} C_6H_{12}O_6 + O_2$$

or

$$\text{Carbon Dioxide} + \text{Water} \xrightarrow[\text{chlorophyll}]{\text{sunlight}} \text{Sugars} + \text{Oxygen}$$

It is the green pigment chlorophyll that takes carbon dioxide plus water and with the energy of the sun makes them into chemical energy which the plant and other organisms can use. Another important product of photosynthesis is oxygen. Without it no life on earth could survive. All this happens in the light, and is called the light reaction of photosynthesis. At night something different occurs. During the day a plant uses the energy as it needs it, but at night it cannot make any energy (no light) so it uses stored energy. The breakdown of stored food into energy is called respiration.

In Respiration:

$$O_2 + C_6H_{12}O_6 \xrightarrow{\text{break down into}} CO_2 + H_2O$$

energy is given off; this energy is used by plants

The amount of oxygen used at night is less than is made during the day. Why is this important?

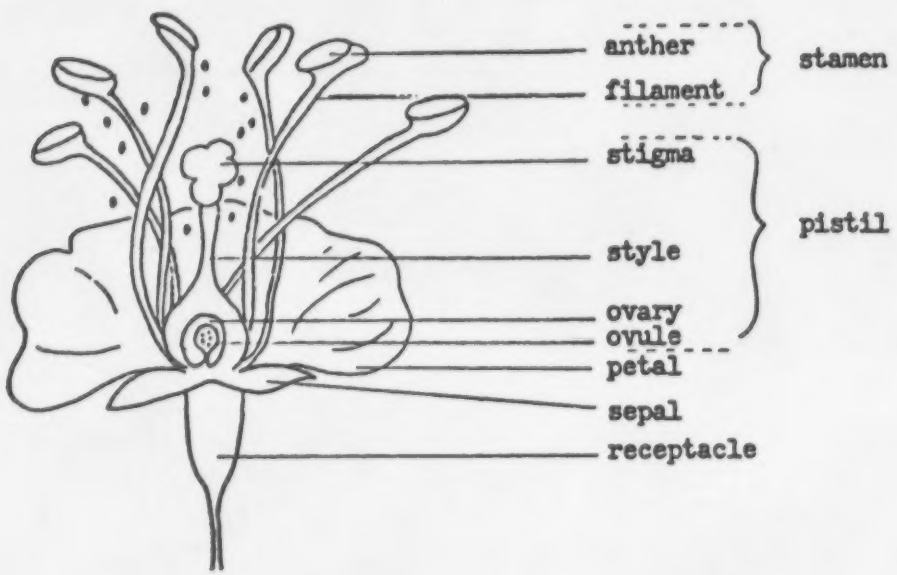
Questions:

1. In what part of the leaf does photosynthesis take place?
2. What is contained in the vascular bundles?
3. Draw a stoma. What is its function?
4. Write the formula for photosynthesis. Name the raw materials and the products (what are produced).
5. How is respiration different from photosynthesis?
6. Where does photosynthesis take place? Why can't it occur at night?

THE FLOWER

All organisms must reproduce. The reproductive system in higher plants is contained in the flower. The flower is actually a very specialized and adapted organ which had its origin as a leaf.

There are several main parts to the flower.



List the functions of the above parts, use the text books provided to find the answers.

anther, filament, ovary, ovule, pistil, petal, stigma, style, stamen, & sepal

You should be fairly familiar with the parts of the flower. In this activity you will look at a real flower and attempt to locate these parts.

Materials: flower, scalpel, hand lens

Procedure:

1. Observe a typical flower and locate the stalk that attaches it to the plant. The enlarged base of the flower is called the receptacle. Directly above this section are the green, leaf-like structures called sepals. Above the sepals there are usually brightly colored structures called petals. Draw a diagram of the flower now labelling the parts you can identify.

   (a) How many petals are found on the flower you examined? Remove the petals as you count them. Draw a diagram of the flower without the petals, labelling the parts you can identify.

   (b) Does the flower have the same number of petals as sepals?

2. Locate the stalk-like structures inside the petals. These are the stamens and they are the male parts of the flower. The anther contains the pollen grains. The pollen grains contain the male sperm cells which may fertilize egg cells in another part of the flower. The anther is at the top of a long thin structure called the filament. The filament holds the anther above the stigma.

   (a) How many stalk-like stamens can you find in your flower?

   (b) How is the upper part of the stamen, the anther, well suited for holding pollen grains?

3. Locate the single thick structure at the very middle of the flower. This is the female part of the flower, called the pistil. The pistil produces the egg cells of the flower, which eventually become seeds. The pistil and the stamens are the essential parts of the flower, since one structure produces the egg cells and the other produces the sperm cells that must fertilize the egg cells before seeds can develop.

4. Gently cut out the pistil with pointed scissors or a razor blade. Place the pistil on a piece of paper and examine it carefully with a hand lens. The stigma is the sticky upper surface of the pistil which holds pollen grains that may touch the surface. The narrower portion of the pistil below the stigma is called the style. Sperm cells from the pollen grains move down through a pollen tube, which grows through the style. The enlarged lower part of the pistil is the ovary. The ovary produces the female sex cells, or egg cells. Then the pollen tube growing down through the style reaches the ovary, the two sperm cells enter the ovary. There one sperm cell unites with other material in the ovary to form a type of stored food within the seed. The embryo plant plus the stored food (endosperm) make up the seed, which can produce a new plant.

Background Information Pollination, Fertilization, and Seed Development

Before an ovule in the ovary can develop into a seed, two events must take place. The first event, pollination, occurs when pollen grains are transferred from the stamen to the pistil. The second event, fertilization occurs when a sperm cell nucleus from the pollen grain unites with an ovule. Let us take a closer look at these two important processes in seed development.

When the pollen grains from one flower land on the pistil of another flower, the process is known as cross-pollination. Cross-pollination is often accomplished with the aid of insects, wind or birds. If pollen is transferred from one plant to another by man, the process is known as artificial cross-pollination. Whenever man artificially cross-pollinates, he does so to produce more desirable characteristics in the plant, e.g. a better fruit, a hardier plant. When the pollen from the stamens lands on the pistil of the same flower, self-pollination has taken place. In many flowers, self-pollination cannot occur because the petals are arranged to prevent the pollen from falling on the pistil of the flower. In other plants the pollen may mature at a different time from the rest of the flower, thus preventing self-pollination.

Some plants depend upon wind to carry pollen through the air. Such plants must produce large numbers of pollen grains so that at least one grain will probably land on the pistil of an identical plant.

In order for fertilization to occur, sperm cells contained in pollen grains must travel through the pistil down to the ovule (or ovules) at the base of the pistil. The sperm cells are able to do this by means of a special pollen tube that develops from a part of the pollen grain after it lands on the stigma. Each pollen grain actually forms two sperm nuclei. One nucleus unites with the ovule in the ovary to start the development of the embryo within the seed. The second sperm nucleus from the pollen grain unites with other nuclei in the egg cell to produce the endosperm within the seed. The endosperm is the fleshy part of a seed which is used for food by the embryo as the seed germinates. Each seed also contains one or two (depending on the plant) cotyledons which will break down the endosperm for use by the embryo.

Questions Based on Background Information

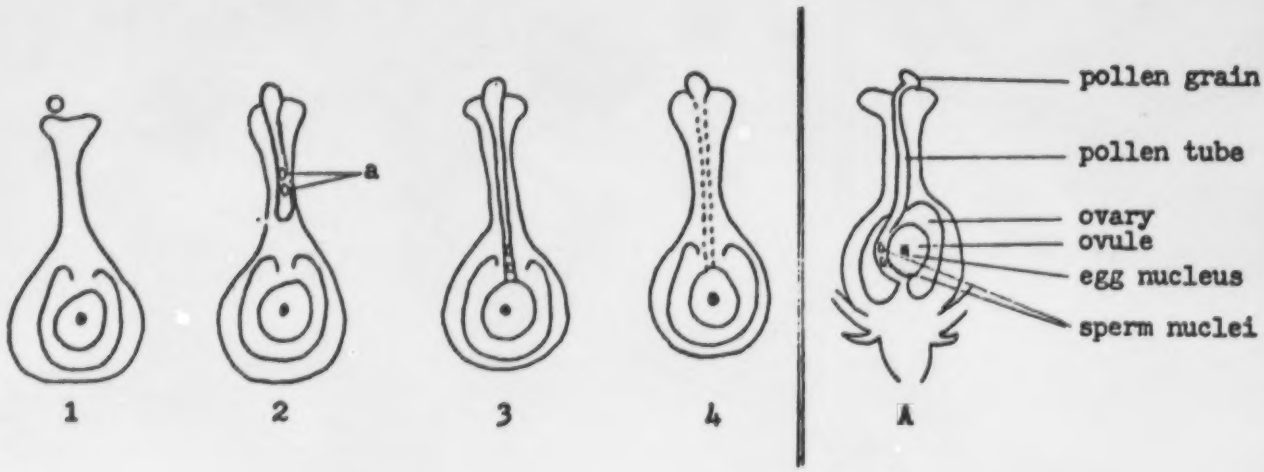
1. What two events must take place before an ovule can develop into a seed?
2. What takes place during pollination?
3. What takes place during fertilization?
4. How does cross-pollination differ from self-pollination?
5. How does artificial cross-pollination differ from natural cross-pollination?
6. Complete the following outline of the steps in fertilization by filling in the blanks:
   (a) A pollen grain lands on the _____ of the pistil.
   (b) The pollen grain develops a _____ which grows down through the _____ of the pistil.
   (c) In the tip of the pollen tube are_____ .
   (d) Once nucleus unites with an _____in the ovary to produce an embryo in the seed.
   (e) The second nucleus unites with the other nuclei in the _____ cell to produce the endosperm in the seed.
7. Pollination and fertilization result in the formation of a _____ .
8. When is the development of a seed complete?

Design

Observations and Inferences

Study the following diagrams and answer the questions that follow. Diagram A has combined the changes in diagrams 1, 2, 3 and 4 and should be referred to for the names of the parts.

Steps in Fertilization



1. What does the pollen grain in diagram 1 contain?
2. When the pollen grain from the anther lands on the stigma the process is called _____ .
3. What change has taken place as you go from diagram 1 to diagram 2.
4. Identify the two items labelled (a) in diagram 2.
5. What change has taken place as you go from diagram 2 to diagram 3?
6. What change has taken place as you go from diagram 3 to diagram 4?
7. What is the name of the process involved in question 6?
8. There is a special name for the egg cell in diagram 4. What is it?

Operational Definitions

Write operational definitions of:
(a) pollination (b) fertilization

Further Evidence

1. How many seeds will be produced by the flower in diagram A?
2. The core of an apple contains 8 seeds. What does this tell you about:
   (a) The number of egg cells that were fertilized?
   (b) The number of pollen grains that had to develop pollen tubes?

3. What would happen if only 3 pollen grains land on the stigma?

PLANT REVIEW

1. (a) Describe Van Helmont's experiment.
   (b) How was our plant experiment like it? Did we obtain the same results?
2. Describe the steps involved in germination.
3. What does the embryo do?
4. What do the central cylinder, vascular bundles and leaf veins have in common?
5. Draw a stoma. What is its function?
6. How are the palisade and spongy cell layers alike?
7. How is the upper epidermis different from the lower epidermis?
8. Write the formula for photosynthesis.
9. How is photosynthesis different from respiration?
10. What parts of the flower make up the stamen?
    What parts of the flower make up the pistil?
11. What happens during fertilization? Double fertilization?
12. How is self-pollination different from cross-pollination?
13. Describe pollination.

VOCABULARY

1. anther
2. carbohydrate
3. carbon dioxide
4. central cylinder
5. chlorophyll
6. chloroplast
7. cortex
8. cotyledon
9. dicotyledon
10. embryo
11. endosperm
12. epidermis
13. fertilization
14. fibrous root
15. filament
16. germination
17. minerals
18. monocotyledon
19. ovary
20. ovule
21. oxygen
22. palisade cells
23. petal
24. phloem
25. photosynthesis
26. pistil
27. pollen
28. pollen tube
29. pollination
30. respiration
31. root
32. seed
33. sepal
34. sperm cell nuclei
35. spongy layer
36. stamen
37. stigma
38. stomata
39. style
40. tap root
41. transpiration
42. transport
43. xylem

PLANTS CROSSWORD

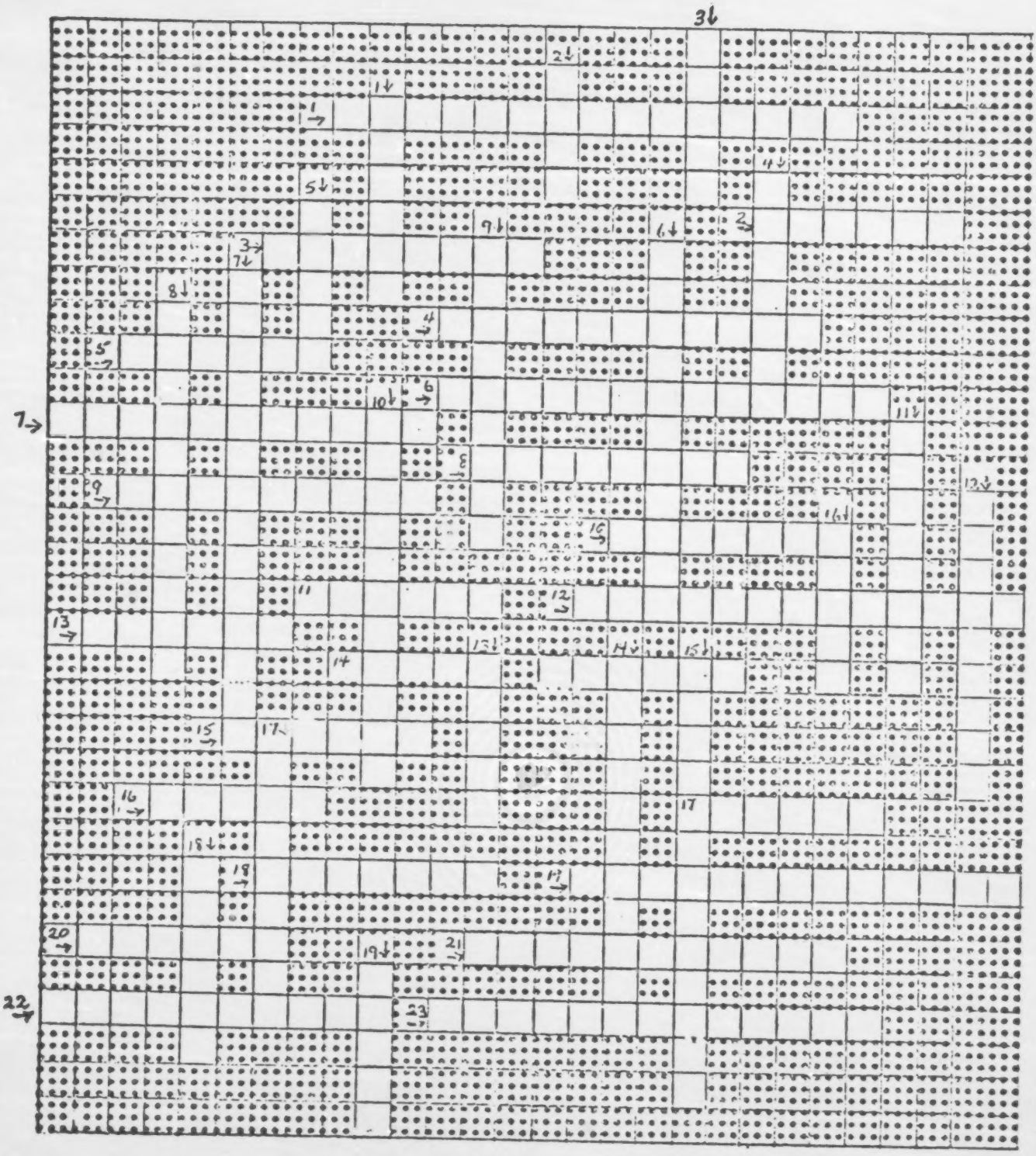
Clues

Across

1. fertilizes the egg cell nuclei
2. produces pollen
3. central_____
4. with 2 cotyledons
5. these cells are alive
6. must take place to produce an embryo
7. these are green
8. necessary for the plant to live
9. seed part
10. root type
11. made by photosynthesis
12. different from #4 across
13. made by stamen
14. sugar is a type of
15. male part of the flower
16. attached to speals
17. sticky end
18. controls water loss
19. photosynthesis take place here
20. will develop into theplant
21. this happens to the seed
22. used to get down the style
23. CO_2

Down

1. female part of the flower
2. plant it
3. produced by ovary
4. carrot, turnip
5. carries water and minerals
6. from anther to stigma
7. needs sunlight
8. pigment of the plant
9. protection
10. where photosynthesis takes place
11. supports the pollen maker
12. food for the seed - embryo
13. makes the ovules
14. to make energy
15. how the leaves give off water
16. between stigma and ovary
17. to move
18. stores carbohydrates
19. protects young flowers



LIBRARY RESEARCH REPORTING SKILLS

Developed By
Ed. E. Simbalist

An Interdisciplinary Unit in Language Arts, Social Studies and Science

STUDENT HANDBOOK - GRADE 7

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LIBRARY RESEARCH REPORTING SKILLS

THE NATURE OF A RESEARCH REPORT

The research report is an important part of your school life, as important as doing exercises in the classroom, homework assignments, or study notes. The farther you progress in your education, the greater the degree of importance that will be given to your ability to write good reports.

If you do not like writing reports and fail to learn how to complete such assignments easily and well, you will certainly encounter serious difficulties in high school. As for university or technical school, your chances of success will be very small indeed. Many students do not understand how many of their opportunities in later years depend upon the ability to write well. It is essential to be able to find the best information on a topic, to organize that information into a logical order, and to present it in a way that shows your understanding of the topic. Some courses in high school, and many courses in university, will have up to half of all the marks based on research reports. Many students fail in their studies because they have not learned to do such work.

The first stage in developing report writing skills is to understand what it is that a report is expected to do.

The research report is known by several names: research report; research paper; term paper; term project; library paper; or simply report. All these are essentially the same.

One characteristic of the research report is that it is always put into formal, correct English. This ensures that the report will be clearly understood by the reader. Errors in spelling, punctuation, word choice, sentence structure, logical organization, etc., will prevent clear understanding. The purpose of all research reports is to provide accurate, complete, and useful information and conclusions about the topic. The more silly or careless errors are presented, the less valuable the report will appear to a reader. Who can take the "facts" presented with any seriousness when the writer of the report demonstrates his inability even to spell a word correctly? It is felt that the report writer probably was careless with a lot more than just his language. Thus the value of the report can be completely destroyed by poor English.

A report is meant to be read. If a reader has to work hard to understand what is in front of him, if he has to guess at what the report writer intended to say, and if he begins to doubt whether the report writer knows what he is talking about, the report fails miserably as a useful presentation of information. Students often will not see that the reader is intolerant of messy, error-filled writing of any kind. A reader does not want to put any more work into understanding a piece of writing than is reasonable. "Care enough to send the very best" or be prepared to be ignored.

To aid reader understanding, certain things are always done according to a generally accepted form. For instance, a bibliography or list of the books and articles used to prepare a report, will always appear in the same form because all informed readers expect the information to be presented that way. The task of the

bibliography is to allow the reader to go to your sources. If you choose to be "inventive" and compose a bibliography any way you please, your reader may find it difficult or even totally impossible to check up on the "facts" you supposedly found. Please yourself, and you may displease your reader. Proper format must be followed to provide for a good level of communication.

A very important part of good research reporting is that it is done over a period of several weeks. Library research, note-taking, listing of books and magazine articles consulted, organizing the information, digesting what the information really means, and writing several drafts of the report itself to produce a readable final copy are all time-consuming activities. It is usually impossible to write a good report in a day or two. Several days simply do not provide the time to do everything well. Thus a good report writer allows himself plenty of "lead-up time" and does not put off the task until the last minute.

Research reports demand careful thought about the subject. Many students make a mistake when they view a report as something that can be easily copied out of an encyclopedia or book. What is expected is a presentation of one's own understanding of what information is important, and then a presentation of one's own understanding of what information means in the light of the specific topic chosen for the report. These can never be given by simply copying down someone else's work. If that was all that was required, why would anyone bother reading your report at all? The reader would just go to your sources and ignore you entirely.

Research reports demand careful organization of information and ideas. Because research involves going to a number of books and articles, a lot of information will be acquired. Some information cannot be used because it is off the topic, out-of-date, or just lacks sufficient importance to be included in the report. The rest must be put into a logical order that presents your understandings. The reader must be able to follow your line of thought without becoming confused. Inexperienced writers often forget that the reader depends upon the report to explain itself. A mish-mash of information and ideas will not increase a reader's appreciation of the topic or his opinion of the writer.

Research represents one's digging out the best information that is available. Suppose the topic is "Canada Today." Information about the population, gross national product, average personal income, industrial production, etc., of Canada taken from a book 25 years old will be far less valuable than information from a book published last year. The topic is Canda Today, remember? Old data can be totally misleading. This is not to say that books published years ago are useless. Sometimes the thoughts and ideas of writers even centuries ago can prove very valuable. But the topic determines what ideas and facts are useful. Facts about conditions today are best found in books published in recent years. Facts about conditions in Canada 25 years ago might be best found in books published some years before the present. What is the best information depends on your ability to tell the difference between usable and useless information. That is rarely an "easy" task and requires thought and time.

Many students make the mistake of settling for the first bit of information they find, not understanding that the main purpose of the research report is to come up with the "best" information and answers possible in the time and the space allowed. If you approach a report with the attitude that it is a nuisance to be disposed of in the quickest and most painless manner possible, you invite failure. You must be prepared to sift through a number of sources, not just one or two, deciding as you go on the most appropriate materials to include in the final copy of the report.

Research report writing is therefore a task which requires much time, thought, searching for information, and organization of that information in a logical way before even a word is set down on paper. Once the material is assembled and put in order, the writing begins. Even then, several drafts may have to be written before a good, clean, smoothly flowing final copy is ready to be handed in to the instructor.

INITIAL PLANNING

When you are assigned a report topic, you have reached the initial planning stage. You must know how to strike a balance between covering your topic well and keeping the report within the desired limits. Few reports are given without minimum and maximum size also being specified. This means that every single word has to count. "Padding" up a report with unnecessary words or simply excess wordage because of sloppy thinking are never welcome.

The usual length assigned for research reports in junior high school will tend to range between 500 and 1500 words. You have already read more than 1000 words. This is about the standard length of a research report. In later years, you will be expected to write longer reports. University graduates, for example, find 5000-word reports to be routine writing assignments. Major research papers, like a thesis for a Masters or Doctoral Degree, can attain 25 000 to 50 000 words or more.

If you do reach such lofty heights in your education, you will discover that major reports are prepared in much the same fashion as were your earliest library research papers! All good research writing depends upon just that: <u>research</u> and <u>writing</u>.

By knowing what you really are doing beforehand, you can plan your activities on a step-by-step basis, instead of floundering around trying to figure out what to do to get that pesky report done by the deadline. The following lessons provide you with the basic skills and understandings to do the job. Your planning for any research project depends upon mastery of those skills.

Initial planning, in short, is knowing which tasks must be done and in what order.

LESSON 1 - CHOOSING THE TOPIC AND BRAINSTORMING THE TOPIC FOR IDEAS

If you have any choice at all in the matter, try to select a subject that is <u>familiar</u> and of some <u>interest</u> to you. That way, you will bring some needed enthusiasm to your task.

If the teacher insists that everyone write on the same subject, try at least to select an <u>approach</u> to dealing with it that you like--even if you don't care for the subject itself.

Two very important considerations to the choice of a topic for your research report are:

1. whether adequate library materials are available;
2. choosing a topic quickly to permit you the maximum time to research and write about it.

In your first library research report assignments, you will not be expected to consult more than a few books or magazine articles on your subject. However, you must ensure that even these limited resources are, in fact, obtainable at your school library or at the public library.

Don't settle for a single source for all your information. At least three sources, and more if at all possible, should be used to give you a broader, better-balanced, and more informed view of the subject. In later years, you may be expected to consult many books and articles, possibly numbering in the dozens, as you are required to become somewhat of an informed "expert" on what the authoritative people in the field think about the topic.

You should also consider whether or not the research and writing will add to your own knowledge. Research is a form of learning. You will learn little if you merely jot down something you already know. That is, in fact, little more than a waste of time better spent finding about something new that interests you.

Above all, don't dither around indecisively. You MUST choose a topic for the reporting assignment. You have no choice in that matter. The more time you waste trying to decide on what you might want to do, the less time you have to devote to the report itself.

You are about to embark on a writing assignment that will produce a library research report of your own, both as practice for future reports and for a grading mark. You will be provided with a list of topics form which to choose. Take every step seriously in the process that will be taught to you in this and subsequent lessons. Apply yourself to each separate activity exactly as though you were looking forward to a grade of "Excellent" because you will be graded on your performance and skill.

THINKING

Ieachers wish to see evidence of a student's own ideas in a report. The ideas should be based on the facts which the student has discovered and includes in his discussion. Be sure to always keep this in mind, for the teacher surely will.

BRAINSTORMING

How does one start the thinking process? Where does one get the ideas to develop in a report? Many students fall down badly right from the beginning and simply don't know what to write about, even if they have managed to choose a topic. They just go blank.

To start the thought process going, try brainstorming. Brainstorming involves listing down all the relevant ideas and questions which come to mind on your topic. This will involve several "tricks":

1. Put down anything that comes to mind about the topic. Don't worry about how silly or stupid the idea looks on paper. Anything goes at this point, so long as it deals with the subject chosen for brainstorming.
2. After about 10 minutes, put down your pen or pencil. You should have from 15 to 20 ideas, questions, and impressions on paper.
3. Examine the ideas to see which ones make sense as a starting point for your report. The whole pupose of brainstorming is to raise some question which the report can answer. Somewhere in your list may be the key to setting up your whole approach to the topic.
4. If you still don't have a clear notion as to which direction to go or have some ideas to develop in your report, don't despair. Read over the list again to fix the problem on your mind, then "sleep on it." Next day, brainstorm some more. You may find that your subconscious mind has added some "ammunition" to your list.

You will be given several brainstorming exercises to do during the lesson. This will be a group brainstorming session. The idea is to list as many ideas as possible in a short time. With one or several students acting as secretaries to write things down, the rest of the group will fire out, one at a time, the thoughts that come to mind. Within a very few minutes, it will be discovered that several hundred ideas have come up!

This experience may convince you that brainstorming isn't at all silly. In fact, you can even enlist the help of friends to brainstorm your own topic. Three or four people can come up with 50 to 100 ideas on a subject within five to ten minutes. Then you might switch roles and help out each of your friends. The result will be a good set of possible questions and ideas to pursue in your research. You will have some sense of direction in your reading.

Note that not all brainstorming ideas are usable. If you have a hundred ideas, you will probably discard ninety. But the remaining ten will likely prove of considerable value.

One consideration to remember when selecting from your brainstorming list is whether or not your readers will obtain any information of value from your report. No matter how limited your topic may be, always attempt to put in something original--a different point of view, a humorous comment, an unusual turn of phrase. Although this is not always possible, brainstorming will help unlock your mind and increase your chances of being interesting and entertaining as well as informative.

LESSON 2 - THE PURPOSE AND PROPER USE OF ENCYCLOPEDIAS

One of the most useful reference works in a library is the encyclopedia. It contains a very far-ranging set of information on a great many topics. As a starting point when faced with a research project, the encyclopedia can prove to be a useful tool. If you read several articles in the encyclopedia on your general topic, you will acquire a good idea of the nature of the subject and perhaps a sense of which direction your report can take. Also, many useful facts can be gleaned from the sections you have consulted.

However, an encyclopedia is a reference work. It is intended to give some basic facts and ideas about many topics. It is, at the best of times, a skeleton outline of any subject area and never gives a complete, exhaustive treatment of a topic.

Students usually misunderstand the nature and use of an encyclopedia. In elementary school, they were encouraged to "look up" something in the encyclopedia. "Reports" they might have written in their elementary years probably consisted of several paragraphs largely lifted intact from an encyclopedia article. They might have been adequate for grade four, five or six. It is not adequate now.

Research reports only begin with an encyclopedia. It is simply not enough to find the relevant encyclopedia section and copy down anything that might be on the topic. Students who misuse an encyclopedia are in for an unpleasant surprise. They will become quite disturbed when their instructor rejects their "work" as lacking in "depth" and "thoroughness."

The fact is that an encyclopedia is the place to go to obtain some idea of where to start looking for information. You will acquire just enough information and understanding of a topic to set your mind thinking about the questions you might want to answer in your report. It will also suggest various subject areas to investigate as you search through the library card catalogue, magazine files, and the table of contents or index of what seems to be a promising book. After all, if you have an idea of what topic headings to look for as you do your research, you at least have a chance of finding useful information.

Beware of the misguided reputation some people assign to encyclopedias. While there are many fine encyclopedias, they are not the "last word" on any subject. Actually, they are written for "lay people" who know little or nothing about the subjects covered. The many articles are written by noted experts in the field, but they give only the bare minimum of information and ideas in terms that average people can understand. Such articles are intended to give general information, not the precise, detailed, thorough explanations and masses of detail often required to really understand or report on complex subjects.

In short, depend on an encyclopedia for all the material included in a report, and you may find that you have said very little.

Also beware of the fact that most encyclopedias will be out-of-date in many respects. The preparation of any edition of an encyclopedia takes two to four years, so even if it is dated 1980, it could be very thin on developments in knowledge after 1975 or 1976. Furthermore, sets of encyclopedias are expensive, and libraries keep them in circulation for years. It is easy to find sets that are ten years old or more. There may be annual supplements to an encyclopedia--volumes which attempt to up-date older editions, but these never do a perfect job.

All of this does not mean that encyclopedias are useless. They are very useful and often provide valuable facts and understandings. Just remember that the encyclopedia is not the chief source of information for any research report.

The place to begin using the encyclopedia is the index. All subjects are listed by alphabetical order in an encyclopedia. The index to all the topics, complete with a cross-reference system, is usually found in the final volume of an encyclopedia set. The following page provides an example of an encyclopedia index:

The place to begin using the encyclopedia is the index. All subjects are listed by alphabetical order in an encyclopedia. The index to all the topics, complete with a cross-reference system, is usually found in the final volume of an encyclopedia set. The following page provides an example of an encyclopedia index:

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The previous index page is taken from the Encyclopedia Americana. It shows just how much information can be obtained. Look up, for example, the heading Undulant Fever. You will find that the encyclopedia contains information about that subject in three places:

Volume 27, p.363, under the name of the disease itself;
Volume 6, p.81, under Cattle; and
Volume 28, p.63, under Veterinary Medicine.

In addition, a cross reference suggests other areas to investigate:

See also Brucellosis.

The index can tell you where to find extra information through these cross references. If you find a "See also" cross reference, that means you should look up that heading in the encyclopedia index to find out where information on that subject is located. It often will happen that you can discover much more about your original subject than was indicated in the areas indicated in the first index entry you consulted.

The index will also refer you to the correct term for a subject. Often, a student will not be able to find information because he doesn't know what to look under. For example, if you look for information on the Union of South Africa, you will discover that you must refer to the correct name of the country: South Africa, Republic of. This is a "See" reference.

Last, on topics where there is a large amount of information, the index will break the whole subject down under sub-headings to save you time. For example, look under Union of Soviet Socialist Republics. Find the sub-heading Agriculture. (Note that it is printed in capital letters, indicating a major sub-heading.) If you are seeking information about the agricultural aspects of the U.S.S.R., you will save yourself a lot of time by consulting the index. You will also find a good deal of information not contained in volume 27 under Union of Soviet Socialist Republics. Note that you are referred to articles in volumes 1, 3, 5, 7, 8, 11, 15, 21, 22, 24, 25, 26, 28 and 29, as well as to volume 27.

The moment that you are assigned a report topic or else have chosen one to write on yourself, it is a good idea to look the subject up in an encyclopedia. Consult the index, find the relevant articles, and read a number of them. This acquaints you with the nature and the scope of the subject. It gives you a basic overview which helps you to understand the subject a bit better. It provides topic headings to use when pursuing information in other areas.

A single hour, properly spent, with an encyclopedia can open up an entire topic for you, making your whole task much easier and the resulting report a superior effort.

LESSON THREE - NARROWING THE TOPIC

Now that you have chosen a topic, brainstormed it for ideas, and have read an encyclopedia article or two on the subject, you have enough basic information to begin considering what you are going to write about.

In other words, you should narrow the focus of your topic. Few subjects are narrow enough in scope that you can just start researching or writing about them. Typically, you must tighten up the topic until it is a manageable size, a topic which you can cover adequately in a short report of 1000 or 1500 words or so.

For example, if you chose Dogs as your topic, you would have to write several pages just listing down the different breeds. Now, that is hardly a "report" in the proper sense of the word. Thus you will have to expand on each breed, writing at least a paragraph or three or five on the physical features and appearance, behaviour, care and feeding, and good and bad points of each breed. By now, you are on the way to writing a very big book on all the dogs there are. Only you are restricted to about 1500 words as an outside limit on your report!

The only solution is to narrow your view. You might choose to limit your research and discussion to one breed of dog, and your Dogs topic has now become "The Saint Bernard." St. Bernards could easily be discussed in 1000 or 1500 words, with information on their origins, as well as the physical features and appearance, behaviour, care and feeding, etc., mentioned previously. You might even have a bit of room for a very short anecdote (story) about the bravery and gentleness of the breed to "bring them alive" for the reader.

To make your topic even better, it might be a good idea to state it in the form of a question which your report attempts to answer in detail: "Do St. Bernards make good pets for children?" "Do St. Bernards really work well as rescue dogs who find and save people caught in avalanches?" or perhaps "Are St. Bernards easy or difficult dogs to breed, raise, and train?" You can then proceed to a lot of details which answer the selected question.

Alternatively, you might present the topic as an argument. For example, you might assert: "St. Bernards should not be kept in the city." "St. Bernards are really gentle dogs." And so on. This technique will give your report a sense of direction. You have a point or several points to prove, and everything you choose to say results in your opinions all being based on facts instead of mere feelings. Anyone can have "an opinion." No one has to agree with an opinion, or even consider it, unless hard facts are presented to support it.

Ultimately, the very serious research reports done by University scholars and by scientists are arguments. The researcher states a "theory" to explain something, then sets out many pages of evidence to prove that his ideas are factually sound. This is the leading edge of human knowledge itself, and trying to write your own beginning reports the same way will help you understand how Mankind's knowledge is advanced in any given subject area. Others read the serious research of experts, think about the arguments and evidence, and then do some thinking and research of their own to see if (1) the arguments hold up and, if they do, (2) to find new knowledge based on those discoveries.

You will be asked to complete an assignment which will assist you in narrowing down your own topic. The skills you practice in the exercise should be of value in improving your own view of what you might do with the subject you have chosen to research.

NARROWING YOUR TOPIC EXERCISE

One of the most important steps in writing a report is to make sure you have a topic which you can adequately deal with in your report. There are two easy ways to state your topic so that it is "narrowed down" into a form that promises good results:

1. TURN YOUR TOPIC INTO A QUESTION WHICH THE REPORT CAN ANSWER:

   For example, your general topic is Elephants. A narrowed topic in the form of a question could be: "Do elephants really have a good memory?" Now attempt to narrow the following general topics by framing them into questions:

   a. General Topic: CANADA

      Narrowed Topic: _____

      _____

   b. General Topic: FOOTBALL

      Narrowed Topic: _____

      _____

   c. General Topic: DRUGS

      Narrowed Topic: _____

      _____

2. TURN YOUR TOPIC INTO AN ARGUMENT WHICH THE REPORT CAN ATTEMPT TO PROVE OR DISPROVE:

   For example, the general topic is Smoking. Your narrowed topic presents the argument: Smoking causes cancer. All of your information and comments will now focus on proving that smoking is a definite contributing factor to one's contracting cancer. Now narrow down the following topics:

   a. General Topic: SCHOOL

      Narrowed Topic: _____

      _____

   b. General Topic: EDMONTON

      Narrowed Topic: _____

      _____

   c. General Topic: UFOs (UNIDENTIFIED FLYING OBJECTS)

      Narrowed Topic: _____

      _____

STUDENT'S NAME: _____ CLASS: _____

GENERAL TOPIC ON WHICH I AM DOING MY REPORT:

_____

NARROWED TOPIC ON WHICH I AM DOING MY REPORT:

_____

_____

KEEP THIS EXERCISE WHEN IT IS COMPLETED. IT WILL BE TURNED IN WHEN YOU SUBMIT YOUR FINAL DRAFT OF YOUR REPORT.

LESSON 4 - ORGANIZATION OF LIBRARY RESOURCES: THE DEWEY DECIMAL SYSTEM

Of course, one of the ways to find out where information on a given topic may be located in the library is to ask the librarian. However, it is also satisfying and sometimes more useful by far to know how to find things on your own.

THE STUDENT'S FIRST RULE: KNOW YOUR LIBRARY!

Every book, magazine, pamphlet, chart, map, or other publication has its proper designated place in a library. Each of them is usually found in that place, too, unless it has been borrowed through the circulation desk or is momentarily being used inside the library by someone else.

A general card catalogue lists all of the publications, alphabetically both by subject and by author. It also lists all publications by title.

A so-called "vertical file" contains booklets, pamphlets, and other miscellaneous material not located on the open shelves or "stacks."

First of all, a good, working knowledge of the Dewey Decimal System will assist you to find any non-fiction resource book you might need. In the Dewey system of classification, each book on factual, non-fiction subjects will be numbered on the outside. Literature, which includes works discussing poetry, drama, and fiction, as well as fictional works, will be assigned a Dewey Decimal number in some libraries. In others, they are filed alphabetically by author in a special fiction section.

The Dewey Decimal System follows a standard order in all libraries:

000 GENERAL WORKS: reference books of all kinds, including encyclopedias.

100 PHILOSOPHY, PSYCHOLOGY, ANTHROPOLOGY, etc.: references on human thought, behaviour, and similar subjects.

200 RELIGION: reference books on the religious beliefs of various cultures and religious denominations -- Christianity, Judaism, Islam, Buddism, Hinduism, etc.

300 SOCIOLOGY: reference works on human society and the way it operates

400 PHILOLOGY: reference works on English grammar, books on writing, etc.

500 NATURAL SCIENCES: references on astronomy, biology, botany, chemistry, geology, mathematics, physics, zoology.

600 USEFUL ARTS: reference works on aeronautics, agriculture, engineering, medicine, mining, manufacturing, printing, etc.

700 FINE ARTS: reference works on architecture, ceramics, engravings, games, sports, music, photography, sculpture, etc.

800 LITERATURE: reference works and actual works of drama, fiction, and poetry.

900 HISTORY: reference works and actual works of drama, history, etc.

The term "reference work: signifies a book about some aspect of the subject area--often containing facts, explanations, and theories and arguments. They may also include material on how to do something (a book on how to repair automobiles, for example). In other words, almost everything written about a topic could be found in the appropriate section.

Many reference works, like encyclopedias, specialized dictionaries, etc., are designed to be consulted for desired information, and rarely are read throughout from cover to cover. "Referring" means that one is looking for specific information about a specific topic. You should expect to have to skim through such works, ignoring all irrelevant facts and ideas. If the reference work contains an index and table of contents (as most do), be sure to use such aids to reduce the time you spend researching your topic.

Books are arranged on the library shelves in numerical order according to their Dewey Decimal Numbers. If two books have the same number, they are arranged secondly in an alphabetical order by author. For example:

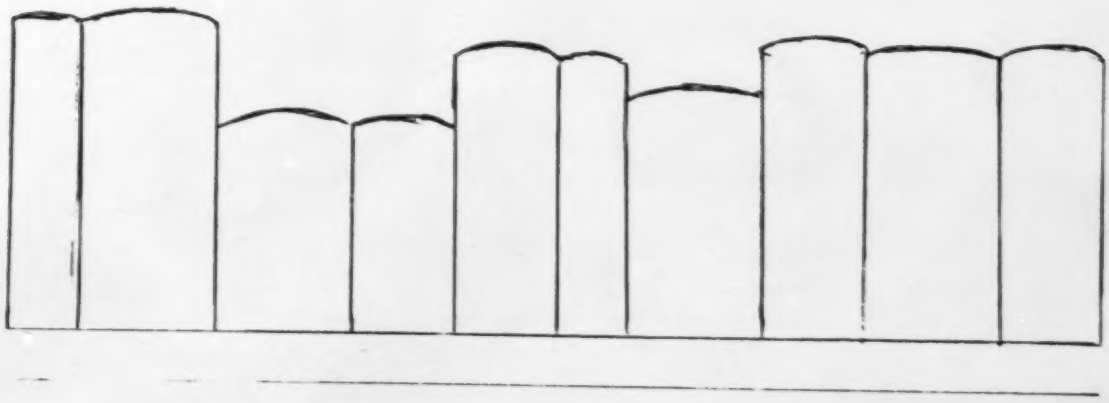
641	642	643	643	643	643.1	643.2	643.2
B	D	A	B	T	M	CA	CR

Do the following three exercies to practice your newly acquired knowledge.

LIBRARY FAMILIARIZATION EXERCISE A

You must understand the "shelf order" of books in the library. Using your Dewey Guide knowledge, put the following call numbers in correct shelf order on the "row" of books provided below:

759 B	698.22 D	698.22 C	031 M
292.6 F	292.59 G	111.18 T	520 K
945.4 C	698.23 B		



LIBRARY FAMILIARIZATION EXERCISE B

Using the Dewey Guide, state in what range of numbers you would expect to find the following books. For example, A History of Canada would be in the 900s; How to Ski would be in the 700s; etc.

Book Title	Dewey Decimal Number
Experiments in Physics	_____
Poems for Fun	_____
A New French-English Dictionary	_____
Helen Keller: The Story of My Life	_____
How to Build Rocket Engines	_____
Reptiles of the World	_____
Teen-age Medicine	_____
The Great Religions of the World	_____
World Book Encyclopedia	_____
The Government of Canada	_____
How to Cook	_____
A History of Art	_____
Exploring the Soviet Union	_____

LIBRARY FAMILIARIZATION EXERCISE C

Using your knowledge of the Dewey Decimal System, go to the shelves and locate one book in each of the following areas. State the author, title, and call number for each book.

Subject Area	Author	Title	Call No.
Sports			
Geography			
Science			
Music			
Poetry			
Mythology			
Dictionaries			
Social Sciences			
Technology & Applied Sciences			
Encyclopedias			

Name of Student _____

Class _____

LESSON 5 - THE LIBRARY CARD CATALOGUE AND HOW TO USE IT

The card catalogue is the index to the contents of the library. It is designed to allow you to find any book by its author, title or subject.

The following illustration is an example of the title page of a book.

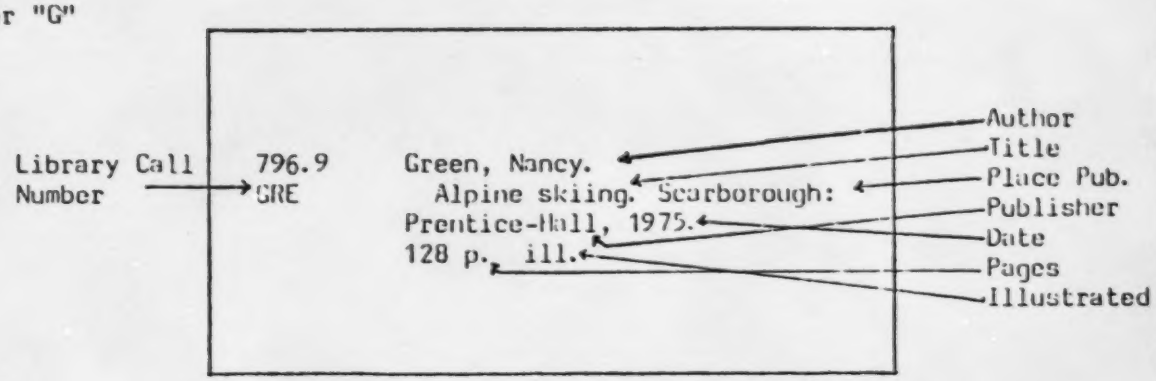
Nancy Greene and Al Raine

Prentice-Hall of Canada, Ltd.
Scarborough, Ontario
©1975

How would one find the index cards in the card catalogue which tell you the Dewey Decimal Number which represents the location of the book on the library shelves?
If you know the title, you would look for the title card.
If you know the author, you would look for the author card.
If you know the subject, but not the title or author, you would look for the subject card.
Each type of card is arranged alphabetically in the card catalogue file, usually located near the main desk or in a prominent place in the library.
The three cards on the next page provide examples of author, title, and subject cards on Nancy Green's book:

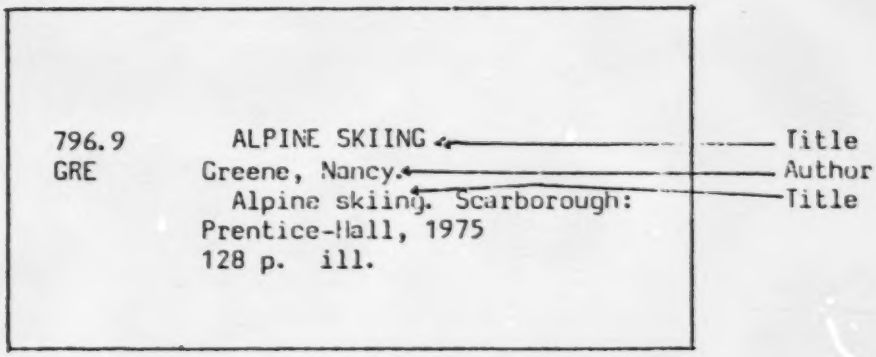
AUTHOR CARD

Filed under "G"



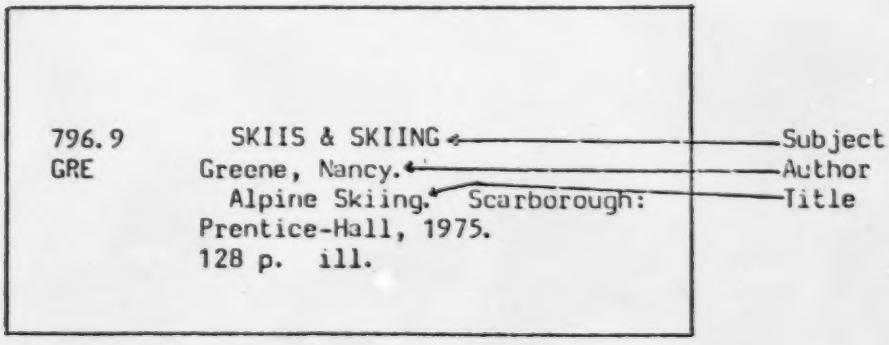
TITLE CARD

Filed under "A"



SUBJECT CARD

Filed under "S"



Once you have located the card for a desired book, write down the title and the call number of the book. Often students fail to do this, trusting on their memories. By the time they get over to the shelves, they have forgotten and must go back to find the card again.

Remember that the title of a book is always found under the author's name. In some instances, there is no "author" as such. Some books are collections of articles by a number of different authors. In such cases, the "author's" name is really the name of the editor or person who collected the articles for publication in the book.

Now do the following exercise: Locate one book on the subject which you have been assigned. Write down the title and call number. Show your teacher the book, the subject you were assigned, and the call number and title. Once your work has been checked, return the book to the proper location on the library shelves.

LESSON 6 - THE READERS GUIDE TO PERIODICAL LITERATURE

In addition to books on the subject you have been assigned or have chosen for your research report, magazines will also provide material which you might find valuable. The question is how to find a useful article.

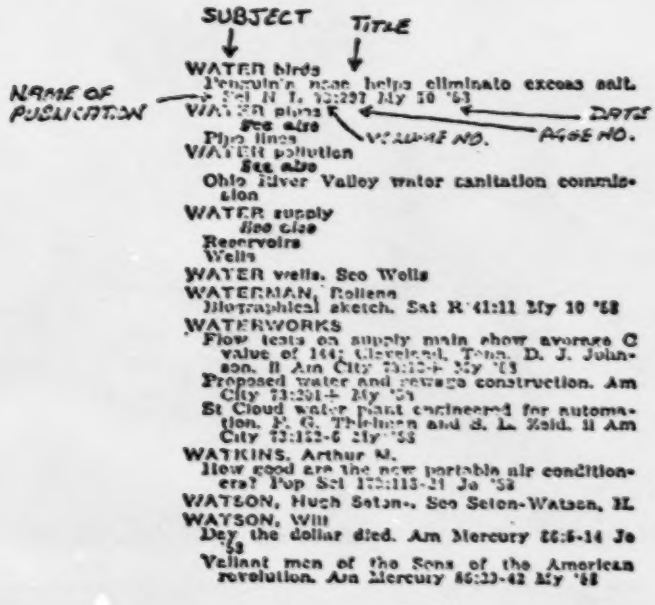
First, discover which periodicals--magazines, digests, newspapers, and the like--are on file in your library. Once you have done that, consult the Reader's Guide to Periodical Literature.

If you haven't heard of this valuable aid to the researcher, it is time you made its acquaintance. In several volumes going back to the beginning of the 20th century, the Reader's Guide to Periodical Literature lists all the feature articles that have appeared in more than a hundred notable magazines.

Magazines articles are listed in the Guide by subject and author. A complete entry is given under the author's name, which includes the title of the article, the name of the magazine in which it is found, the page numbers, and the date of publication.

You may have to consult the abbreviations used for various magazines, given in the front of the Guide.

The following is a sample listing from the Reader's Guide. Note that articles are grouped under general subject headings, which eases finding an article on a given topic:



WATER birds
Penguin's nose helps eliminate excess salt. Sci N L 82:297 My 10 '63
WATER plants
See also
Pipe lines
WATER pollution
See also
Ohio River Valley water sanitation commission
WATER supply
See also
Reservoirs
Wells
WATER wells. See Wells
WATERMAN, Rollena
Biographical sketch. Sat R 41:11 My 10 '58
WATERWORKS
Flow tests on supply main show average C value of 144; Cleveland, Tenn. D. J. Johnson. Il Am City 73:13-4 My '58
Proposed water and sewage construction. Am City 73:201-4 My '58
St Cloud water plant engineered for automation. P. G. Thielman and S. L. Reid. Il Am City 73:132-6 My '58
WATKINS, Arthur M.
How good are the new portable air conditioners? Pop Sci 172:113-21 Je '58
WATSON, Hugh Seton-. See Seton-Watson, H.
WATSON, Will
Day the dollar died. Am Mercury 86:5-14 Je '58
Valiant men of the Sons of the American revolution. Am Mercury 86:33-42 My '58

WATT, Douglas
Musical events; concert records. New Yorker 34:127-9 My 17 '58
WAYNE, John
Cutups from Canada. por Newsweek 51:88 My 19 '58
WEALES, Gerald
Movies. Reporter 18:39-41 Mr 6; 43-4 My 15 '58
WEASELS
Early sexual maturity in the female short-tailed weasel. W. J. Hamilton, jr. Il Science 127:1057 My 2 '58
WEATHER
See also
Hot weather
WEATHER control
Forecast for weather control: brighter. F. Bello. Il Fortune 57:111-7+ My '58
Weather as a weapon; ed. by J. K. Lagemann. H. T. Orville. Il Pop Sci 172:87-9 Je '58
WEAVER, Warren
Tu y're hip on history. N Y Times Mag p81-2 My 11 '58
WECHSBERG, Joseph
Booming Robin Hood n. Holiday 23:28-9+ Je '58
Profile. New Yorker 34:49-50+ My 17 '58
WEDDING cake. See Cake

LESSON 7 - HOW TO CHOOSE BOOKS FOR YOUR RESEARCH

Clearly, your work with the card catalogue and the Periodical Guide will provide you with a number of titles to find in the library. Once you have found some books and articles on your topic, look them over to determine which ones will assist you the most.

Some ways you can discover how useful a book might be are as follows:

1. Read the "blurb" which might appear on the back or the inside of the book cover. The blurb provides a brief description of the contents of the book. If it proves to be promising, a closer look is clearly indicated. At the same time, remember that you may not always find out whether or not the book contains the information you need. A blurb description is necessarily brief and does not list exactly and in detail all of the topics covered by the author.

2. Check the table of contents for a chapter on your subject. Clearly, if such a chapter exists, it should be skim read to see how much useful information it does contain. The table of contents is located near the front of a book. If the topic you were reporting on was the question "Is noise dangerous to your health?", you could find at least two chapters in the book whose table of contents is reprinted below:

Contents

1	Assault on our Ears	7
2	The Anatomy of Sound	11
3	The Dangers of Noise	23
	Damage to Living Things	23
	Damage to Nonliving Things	38
4	The Noisemakers	41
	Domestic Noise	41
	Neighborhood Noise	49
	Traffic Noise	51
	Aircraft Noise	61
	Construction Noise	70
	Industrial Noise	75
	Noise for Fun	81
5	Quiet Please!	85
	Glossary	93
	Index	95

3. Check the index in the back of the book. Most reference works contain a fairly good index, and your topic is likely to appear there if the book deals with it at all. Look for groups of pages together. For example, if you look up Saint Bernards in the index of a book on dogs, and it refers you to the following pages: 6, 12, 18-25, 37, 42, 69-73, you should turn to page 18 and read through to page 25, then go to page 69 and read through to page 73. These two sections are clearly going to refer to your topic a number of times, and may contain long passages on Saint Bernards. If no groups of pages exist together on your topic, it is likely that the book will not be very helpful to you.

LESSON 8 - SKIMMING BOOKS FOR INFORMATION

When you think you have found a promising book or article for your report topic, the time has arrived to check out the actual usefulness of the reference work.

Most students make the mistake of trying to read everything. This is both time-consuming and unproductive. If you have used the table of contents and the index properly, you will know the pages that might be of any use to you. The others will likely not be worth your bothering with at this time, since your task is to research a specific report topic, not to learn everything about the general subject.

Skimming is the key to covering a lot of words quickly to find out what value a book will have for you. Skimming involves reading the first sentence or two of each paragraph to see what the paragraph covers. Since most reference writers tend to put the topic sentence of a paragraph at the beginning of a paragraph, the information it contains will readily become apparent. If the first few sentences do not seem to be dealing with your report topic, it is fairly likely that the others in the paragraph will not do so either. Thus you can "write off" such a paragraph as probably being of little value to your completing your task.

On the other hand, if a paragraph does immediately seem to be on your topic, you can note the fact and be prepared to read it in some detail later. Remember, at this stage in your research, the idea is to locate possibly useful sections, not to read every word on the topic.

Once you have gone through the promising parts of a book or article, you have acquired some idea of where the usable information can be located. When you begin reading in earnest, you can go straight to the profitable parts. The time saved can then be spent on doing the many other important tasks involved in preparing a good report.

You may also find thatyour skim reading has shown a book or article that seemed worthwhile at first is really of no use to you. In such an instance, you can set the reference aside and look into others.

You will be given a skim reading exercise to illustrate how you can develop this important skill. Suppose that you have been given the topic of Noise Pollution, and you have narrowed it down to the question: "Does noise cause damage to our health?" The relation of noise to our health is your sole concern. Only passages dealing with noise and its effects on our health concern you. Everything else is irrelevant (that means, having no bearing on your topic whatsoever) and can be ignored.

Skim read the chapter shown to you by your teacher on the overhead. Remember to read only the first one or two sentences at the start of each paragraph. Try to decide whether the entire paragraph is worth bothering with later, or if it could be ignored as relatively useless to the writing of your report.

The process you go through in this exercise is exactly the same as the one you would follow when you are investigating a book or article for the topic you

have actually chosen or had assigned for your report. Master it, and you will develop the skill needed to decide quickly on the value of any reference and to locate promising sections to be dealt with in more detail when you are reading for understanding and making notes.

LESSON 9 - TAKING NOTES FOR A RESEARCH REPORT

One of the hardest lessons for students to learn is to take down notes properly when they are preparing a research report.

Most students are upset by the seeming "waste of time" that they think exists in the procedure which is described below. They feel that it is easier to copy down the information directly from a reference onto the written page. In actuality, they will be limiting the flexibility of their ideas and facts. Once the words are written down, line by line and page by page, few students will devote the time needed to reorganize and rewrite their work. This sometimes leads to information being "tacked on" later on in the report, quite out of logical order. More commonly, it leads to the academic crime of plagiarism.

PLAGIARISM

Plagiarism is passing off the work and especially the words of another person as if it is the reporter's own work. Put another way, IF YOU COPY DOWN DIRECTLY THE WORDS OF ANOTHER PERSON WITHOUT INDICATING THAT IT IS A QUOTATION, YOU ARE GUILTY OF A VERY DESPICABLE ACT AS FAR AS SERIOUS ACADEMICS ARE CONCERNED. Plagiarism is a form of robbery. It is the deliberate and dishonest use of someone else's efforts and ideas without giving him the credit. Even worse, it is a foolish attempt to pretend that you are smarter and more knowledgeable than you really are. This type of "game playing" is universally disliked by thinking people.

In higher levels of learning, plagiarism can lead to a person being expelled from a college or university. That means he is kicked out and not allowed to complete his studies at that institution of learning. A person's whole future can be permanently marred by plagiarism.

In public school, many teachers will impose a serious penalty against a mark assigned for a report, or may even assign an outright zero if plagiarism is detected.

The fact is that the person desiring the report wants your ideas, not "borrowed" ideas that show no evidence that they have ever passed through the brain of the report writer. The research report is evidence that the writer has learned something and now understands a topic better than he did before. To merely copy a paragraph or a page from a book shows only that the writer can do the same job in handwriting as a Xerox machine does.

AVOID COPYING WORD FOR WORD: USING NOTE CARDS

In order to prevent even unintentional plagiarism, there are a number of tricks that a report writer can use:

1. Use 3"x5" file cards when taking notes. That way, it is impossible to write down very much on any one card. This prevents the "lifting" of large passages from your reference sources.
2. Use point-form or reworded sentences when taking down information. When you change the wording, you begin putting things into your own manner of writing and thinking. This both avoids plagiarism and begins your own understanding of the topic at the same time.

3. When using note cards, don't put down more than one idea or piece of information on any one card. This allows you to shuffle the order of the information you have obtained from four or five different sources with ease.

The note-card system of recording information for a research report is used by every good report writer. Large amounts of facts, ideas, opinions, etc., can be broken down into very easy-to-handle bits that can be stored in a small space and yet which can be arranged and re-arranged without requiring a person to write and rewrite his ideas. Only when the order of the material gathered is satisfactory does the final report get written.

The form a note card takes is fairly flexible. However there are several points that must be kept in mind.

First of all, make a card which lists down all the information needed to identify a book or article used in researching the report. In effect, you make out a card that looks like an author card in a library card catalogue. See this booklet for the form the card should take. You should list down the author's name, with the last name first, then given names or initials. This is followed by the title of the book. The place the book is published comes next, followed by the name of the publisher and the date of publication.

The "book information card" gives you all the information you need to find the book again. You might even note down the call number. Later, when you prepare a bibliography or list of the references you used for you report, you will have all the information needed.

Once you have the "book information card" filled out, you can begin taking down notes on other cards. The note cards should have the last name of the author of the source book and the page number of the book on which the piece of information was found. It also allows you to find the place and perhaps add additional details if it later appears that you have a "sketchy" treatment of that particular part of the topic and need more information.

As pointed out, do not put more than one piece of information on a note card. It might seem "wasteful" to end up with 40 or 50 cards when you could have squeezed everything on 20 cards, but that is really misguided thinking. THE WHOLE IDEA OF NOTE CARDS IS TO GIVE YOURSELF FLEXIBILITY, SO THAT YOU CAN ARRANGE AND RE-ARRANGE INFORMATION QUICKLY AND EASILY. If you use the false economy of putting several facts or ideas down on the same card, you are stuck with the facts and ideas in one place. Remember, your information is coming from a number of sources, not just one. What do you do if you have a fact from one source that fits in between two ideas you obtained from another book but wrote down on only one card?

Remember also that not every fact or idea will be used in the end. When you have all the note cards spread in front of you, it may become obvious that some information simply won't fit in. With note cards, it is easy to remove one here and another there.

You will be given an exercise in the use of the note cards to glean information from books and articles. You are also expected to compile a set of cards for your report. At least 25 to 30 cards should be prepared, and probably quite a few more. The advantage of using them should be readily clear to everyone after the exercise.

DEMONSTRATION READINGS FOR OVERHEAD TRANSPARENCIES USED TO TEACH LESSONS EIGHT & NINE

Taken From: Claire Jones, S.J. Gadler, P.H. Engstrom, Pollution: the NOISE we hear. Lerner Publication, Minneapolis, 1972.

1

Assault on our Ears

Thirteen-year-old Roy Innis lay dead on the sidewalk in front of an apartment building in the Bronx. Only minutes earlier he had been happily shouting, racing, and wrestling with his brother and two friends. Roy had been shot and killed by a man trying to sleep in one of the second floor apartments, a man who had been driven to distraction by the noise the boys were making. As the angry neighbor came downstairs with his pistol, the boys started to run. Roy was killed by a shot that struck him in the back.

When a new flight path brought low-flying military jets directly over his home near Munich, Germany, artist Helmut Winter complained to the authorities. But the flights continued. Infuriated by the persistent noise, Winter set to work building a modern version of the Roman ballista, a device which projected missiles in the

manner of a greatly enlarged slingshot. For his projectiles Winter used potato dumplings, aiming them at the fuselages of the low-flying planes. Striking with a solid "plop, plop, plop," the dumplings caused such frightening vibrations throughout the aircraft that the flight path was changed to avoid them, and Winter's life became peaceful once again.

Like Helmut Winter and Roy Innis, people over the centuries have learned that noise can be both annoying and destructive. Two thousand years ago the Chinese used noise as a device to torture and punish criminals. The culprits were forced to listen to the noise of bells ringing loudly, without interruption; they first went insane and then died. In the first century B.C., Julius Caesar tackled the problem of traffic noise in Rome by banning chariots from the cobblestone streets at night because the noise they made was disturbing the Romans' sleep.

In our living, breathing, moving world, noise is all around us. What can you hear now, this minute? Birds singing? The soft chords of a guitar? Traffic noise? The pounding of feet in a hallway? Voices cheering your team to victory? The whine of a jet? Your next-door neighbors arguing?

Sound is an important part of our everyday lives. It is a form of communication by which we exchange thoughts and feelings. It calls forth all kinds of emotional responses, ranging through many levels of pleasure, indifference, annoyance, fury, or even physical pain. We each react to sounds in our own individual way, depending on what the sounds mean to us personally. When sound is unwanted, we call it noise. Some sounds are universally disliked—for instance, the screech of a jackhammer or the rattle of

The screech of a jackhammer is one of the most unpopular noises heard in our city streets today.

a riveting gun. But often the distinction between pleasurable sound and unwanted noise is purely a subjective one, varying from one person to another and from one time and place to another.

During most of the day, a bird song is a pretty and welcome sound. But in the early hours of a summer dawn the chirping and twittering of birds can be an irritating

noise which disturbs our sleep. Speech can be a friendly and useful sound, telling us things we want to hear. But the harsh yak of a voice which never stops soon becomes unwanted noise. When we are waiting at an airport for someone we love, the whine of an approaching jet can seem an exciting and welcome sound. But to thousands of people living nearby, that same whine from that same jet is an infuriating noise.

Music in all its wide variety of sound causes widely differing reactions. In this area perhaps more than any other, one man's delight is another man's horror. We may dig the mind-blowing hard rock at our own parties, but the late-night frenzy of a neighbor's party makes a noise that we prefer to do without. Most people have very definite ideas about when and where they want to hear music. When the English playwright George Bernard Shaw went into a famous London restaurant, he was treated with great deference by the headwaiter, who said to him, "While you are eating, the orchestra will play anything you like. What would you like them to play?" Shaw replied, "Dominoes."

Shaw was able to make a choice about the sounds he would hear, but most of us are not so fortunate. Our lives are filled with all kinds of noise, and much of it is potentially damaging. It can hurt our bodies and our minds. It can hurt the other living creatures with whom we share this planet. It can destroy nonliving things made of metal and glass. As the noise levels in our crowded society rise higher and higher, we face increasing problems of noise pollution. Before we look more closely at some of these problems, let us think a little about the nature of sound itself.

10

3

The Dangers of Noise

Damage to Living Things

For centuries people have assumed that deafness was part of the normal process of growing old. But now an increasing number of scientific tests are producing evidence that the deafness which comes with age is actually caused by the noise which continually bombards our ears.

Many years ago, Thomas Edison predicted that if urban noise continued to increase as it was doing then, modern man might evolve into a creature that is born deaf. More recently, Dr. Louis Freeman, a medical research director, said, "If city noise continues to rise as it has been rising—which is at the rate of one or more decibels per year—everyone will be stone deaf by the year 2000."

In the United States today, noise pollution is costing industry as much as $4 billion a year through time lost on

the job and through payments of workmen's compensation for illness, deafness, and other physical damage caused by noise. The Veterans Administration spends $8 million a year on the claims of 5,000 servicemen whose hearing has been damaged by the noise of weapons. Around $65 million a year goes for rehabilitation programs to help 90,000 veterans who suffered hearing damage in the service.

It is apparent that many Americans have already fallen victim to the destructive force of noise. Others are being hurt by noise and do not know it. The deafness caused by noise pollution is insidious: it sneaks up on us so gradually that we do not realize how much hearing we have lost until it has gone forever. The effects of continuing loud noise are cumulative—they build up over a period of time. Eventually they cause a wearing away of the microscopic hair cells in the ears, which play such a vital part in transmitting sound to the brain. Cells which do not recover when the noise stops disintegrate completely. A single loud blast, such as the noise of a cannon, can destroy many of them irreparably. Loud noise is also known to cause a constriction of the tiny blood vessels in the body. Thus Dr. Samuel Rosen, a leading ear surgeon and auditory researcher in New York City, believes that continued exposure to excessive noise might eventually lead to a chronic state of blood deprivation in the inner ear and finally to the death of the cells involved in hearing.

The middle ear contains muscles which react automatically to protect the inner ear from excessive noise. When an intense noise occurs, the muscles contract, tightening the eardrum and the tiny bones in the middle ear. This action prevents the full force of the vibrations

from being transmitted to the inner ear. But these muscles can become weakened by too much use so that they are no longer capable of diminishing loud noise. People whose protective ear muscles remain strong usually keep acute hearing later in life than do people with weakened muscles.

The eardrum is another part of the human ear which is vulnerable to noise pollution. The strong vibrations of a sudden loud noise can cause excess blood to be sent to the eardrum; this reaction produces intense pain and in extreme cases may cause the eardrum to bleed. The eardrum can also be ruptured by violent sound-wave pressure such as that caused by big guns or bomb explosions. If the bones of the middle ear are not damaged, then the eardrum usually heals and some hearing returns.

A very loud noise or explosion can cause not only these varying degrees of permanent damage but also a more noticeable temporary loss of hearing. Immediately after being exposed to a loud noise, we find it difficult to hear moderate sounds such as normal conversation. It usually takes several hours for our ears and brains to readjust.

In an effort to discover the temporary effects of exposure to loud noise, researchers at the University of Florida College of Medicine tested the hearing of a group of 14-year-olds before and after they went to a dance. At the dance, sound level meters registered 107 decibels at the center of the dance floor and levels of 120 decibels—more than twice as loud—near the musicians. The research workers found that the average loss of hearing among the young people immediately after the dance was 11½ decibels. (In other words, the intense noise had temporarily raised their hearing thresholds; sounds had to be 11½ decibels *louder* than usual in order to be heard.) One boy

LESSON 10 - ORGANIZING NOTES INTO AN EFFECTIVE ORDER

Once you have read through your source books and have made up note cards, the time to sit back and analyze what you have is at hand.

Lay out your cards in front of you. See if a number of cards all seem to be talking about the same thing. Put them together. Then return to the remaining cards and see if another group of cards are again talking about a specific aspect of the subject. When you finish, you will likely end up with anywhere from three to ten piles of cards.

Now look at each pile of cards. It probably represents a paragraph, or perhaps two, of your report. See if the ideas seem to move along from one to the next. Try arranging the cards so that they make the best sense as you read them from the first to the last. Once you have the best order, label the cards. The pile that would represent what you might write at the start of the report could be labelled "A", with each card numbered in order: A-1; A-2; A-3; etc. The next pile of cards would be labelled B-1, B-2, etc., until you have all the cards labelled.

Your facts and ideas are now safely in order. Even if you accidently drop the whole bunch by accident, it will take only a short time to get them back into the proper order.

In effect, your report is beginning to write itself. With everything in order, all you have to do is start putting things down in good sentences, taking care to provide your own explanations or comments so that the information you are obtaining from the note cards flows smoothly along. Remember, you are not obligated to put down only what is on the cards. You are expected to contribute your own ideas and explanations wherever it seems necessary to do so.

You will be given an exercise which demonstrates how the organization of note cards is done. Pay close attention to the lesson so that you can do the same thing with your own cards when the time comes.

LESSON 11 - ESSAY FORMAT

The actual report should follow the "conventions" of formal writing--that is, it should exhibit all the accepted ways of doing things which experienced writers respect and will follow as a matter of course.

NEATNESS

Any formal writing should be presented as neatly as possible. Remember that the more messy the appearance of your report, the more critical and disapproving your readers will become. Many readers take messy work as a personal affront because you did not care to "send the very best." Since the reader will tend to be a teacher or else a superior in the workplace, it is wise to put him in a good mood.

1. Handwriting (or typing) should be clearly legible.
2. Errors may be corrected by drawing a single line through a word, by carefully erasing the error and rewriting the word, or by covering the error with corrector fluid and writing the correction over it. Rewrite the page if necessary.
3. Pages should be unfolded and untorn.

SAMPLE "NOTE CARD" SET TO DEMONSTRATE LESSON TEN

Allen p.98 Dr. Kay of Stanford predicts whole world will be deaf by year 2000 if noise continues to increase at present rate.	Jones p.24 $4 000 000 000 spent every year on health problems caused by noise.	Abel p.8 Laws prohibiting noise are now being passed.
Abel p.10 $50 fines are charged in Chicago for honking a car horn.	Abel p.11 Emergency vehicles now only use sirens when absolutely necessary.	Clarkson p.65 Courts now award money in compensation to people who have lost their hearing at work.
Jones p.24 Africans living in a very quiet environment hear better at age 75 than most North Americans at age 25.	Allen p.99 Studies have shown that construction workers have more problems with deafness than librarians.	Allen p.100 Rock musicians usually lose 50% of their hearing by age 25.
Jones p.7 Chinese used noise to torture criminals (they first went insane, then died).	Jones p.6 A 13-year-old boy shot to death by a man who was driven insane by the noise the boy was making.	McKay p.108 If loud noise continues for a long time, cells in the ear die from a lack of blood.
McKay p.107 Sudden loud noise can cause the blood vessels in the ear to contract.	Jones p.27 Ringing of the ears is usually an indication of permanent ear damage.	McKay p.107 Strong vibrations caused by noise will rupture the eardrum.
Jones p.26 Eardrums can be ruptured by sound wave pressure.		

The report should be "pleasing to the eye" of the reader in order to create a good first impression. A "dog's breakfast" will not encourage your reader to approach your report with much enthusiasm and will affect his evaluation of your work.

THE TITLE PAGE

Many students and some teachers believe that a "pretty" title page with a striking drawing or picture pasted under the title somehow makes all the difference when one is writing a report. A decorative title page might dress up a report, but it is not essential. The only requirement is that the title page clearly identify (1) the subject of the report, (2) the writer, (3) the course for which the report is submitted, and perhaps (4) the date the report is handed in to the teacher. Use the following form:

THE SAINT BERNARD:
MAN'S NOBLEST FRIEND

Ralph Student
Language 7-1
January 25, 1981

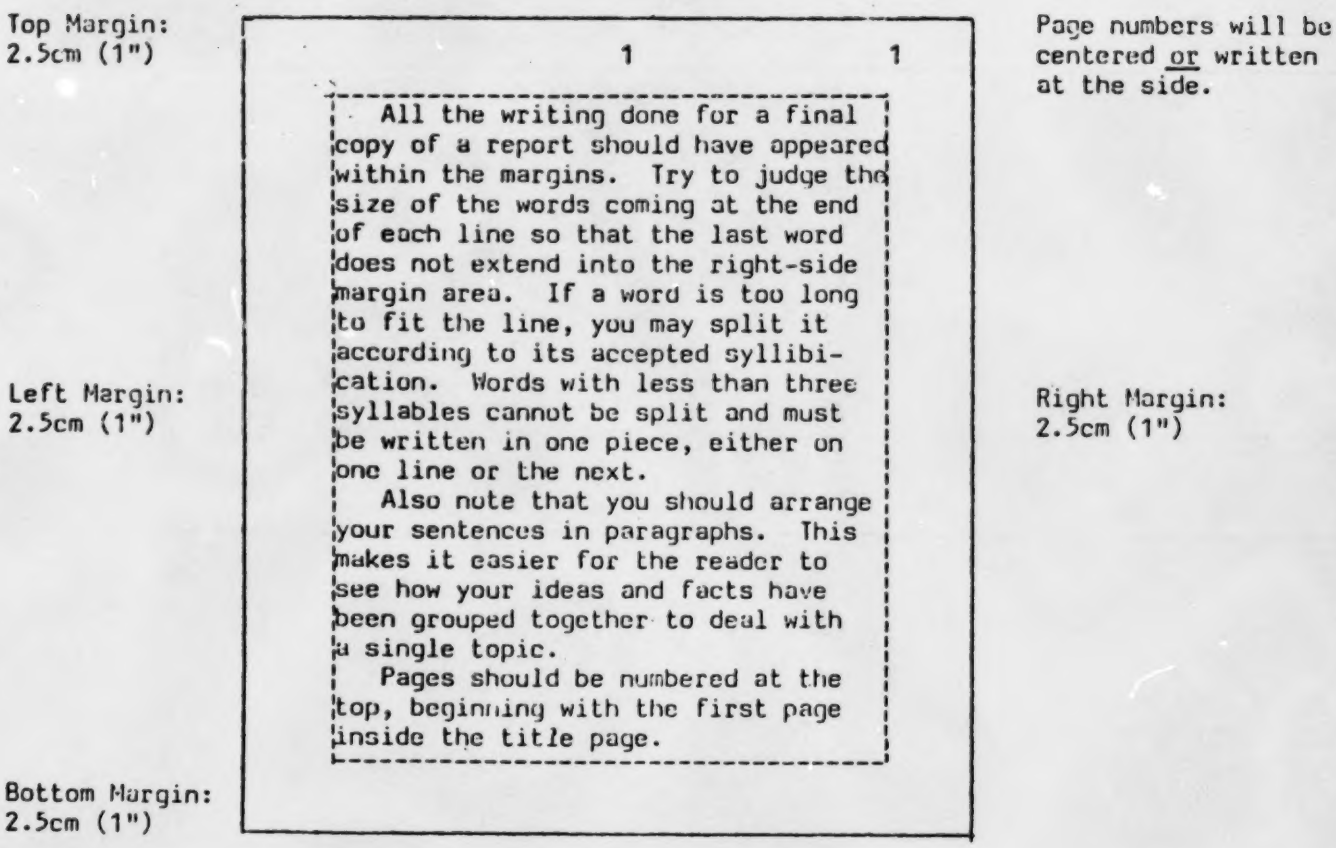
THE INTERIOR PAGES: MARGINS & PAGE NUMBERS

No matter what is written on the inside pages, you are expected to leave appropriate margins free of words at the top and bottom and along the right and left sides of each page. A margin is an imaginary line that defines the limits of your writing, forming a border all around the page.

Top and bottom margins should be about 2.5 c.m. (1") wide.

Side margins should also be about 2.5 c.m. (1") wide.

The following Illustration shows how a page might look with proper margins. Note that the margins are indicated by a broken line. In an actual report, you would not, of course draw the margins. The margins are marked in here only to show you where they are:


Top Margin:
2.5cm (1")
1 1
Page numbers will be centered or written at the side.
All the writing done for a final copy of a report should have appeared within the margins. Try to judge the size of the words coming at the end of each line so that the last word does not extend into the right-side margin area. If a word is too long to fit the line, you may split it according to its accepted syllibication. Words with less than three syllables cannot be split and must be written in one piece, either on one line or the next.
Also note that you should arrange your sentences in paragraphs. This makes it easier for the reader to see how your ideas and facts have been grouped together to deal with a single topic.
Pages should be numbered at the top, beginning with the first page inside the title page.
Left Margin:
2.5cm (1")
Right Margin:
2.5cm (1")
Bottom Margin:
2.5cm (1")

It should be noted that most students will be using three-ring looseleaf paper to write their reports. Such paper is already provided with a top and left margin. The right margin can be taken where the left-side margin printed on the other side of the paper is showing through the paper. Since a line is about ¼" wide, about 3 or 4 lines should be left at the bottom of the page for a margin.

If you do go over the right-side margin a bit, do not be upset. The margin is not absolutely required to be free of any writing. But try to avoid it where possible.

The accepted way to avoid moving into the right-side margin space is to break your words, using a dash (-) at the end of a syllable, then continuing the rest of the word on the next line. If you are unsure of where to break a word, consult a dictionary. All entry words in a dictionary are divided according to syllables. Thus you have a ready guide to follow. Remember that words of one or two syllables are never broken. Also remember that words which are improperly broken are regarded by most teachers and professors as spelling errors and are penalized accordingly.

Each page should be numbered consecutively, beginning with the first page inside the title (cover) page. The page number is placed in the top margin, either at the side or centered at the top. Some students might prefer to put the page number at the bottom, but this should be discouraged. Most readers automatically look to the top of a report for the pagination number.

Another very annoying problem to avoid is the wandering left-side margin. Some students apparently cannot understand that the left margin acts as a guide, from which all words at the beginning of each line will begin, except for the indented first line of a written paragraph. They begin to wander away from the left margin as their lines progress down the page, resulting in an irregular margin that proves most distracting to the reader. This sort of thing seriously takes away from the appearance of your report. It also annoys the reader. After a while, that annoyance is attached to what you are saying. The result is that you may receive a lower mark for your work. You have probably noticed already that this paragraph has been typed without regard for a left-side margin. Consider your own feelings about the wandering margin here, and think what a teacher might be feeling after reading three or four pages written like this. It is quite conceivable that he doesn't really like it any more than you do now. Therefore, pay close attention to margins.

THE INTERIOR PAGES: LINE SPACING AND PARAGRAPHING

This page is arranged to illustrate the appearance of your writing inside the margins. If you are handwriting your report, it is acceptable practice to write on every line, the same way as this paragraph is being typed. It is possible, however, that your teacher may require you to double-space all of your handwriting, so that corrections and comments may be inserted above or below your words. You may assume that single-spacing is acceptable unless it is specifically stated by the teacher that double-spacing must be used.

If you are typing your report, on the other hand, the accepted practice is to double-space each line of typing. This permits the teacher to circle misspelled words, insert punctuation corrections, make comments, etc., with some hope of his efforts being readable. Single-spaced typing is hopelessly cramped for space, and correction is impossible to do easily.

You are also expected to arrange your sentences into paragraphs. Each paragraph will typically contain from three to eight sentences, on the average. Sometimes they are longer or shorter. The sentences are placed together because they all deal with the same topic or sub-topic and thus are natural companions. By separating these related sentences from others above and below them, the complete "package" of thought they contain will become clearer to the reader. The paragraph is begun with the first sentence indented about 1/2" (1.25cm) from the left-side margin. The indentation signals the start of a new paragraph and prepares the reader for a change in the topic or the emphasis of the report unfolding before him.

Failing to paragraph your report will result in monotonous line after monotonous line of writing. The reader will become confused at times, for the topic will change from time to time. Unprepared mentally for the "shift of gears," the reader will sometimes have to re-read a section several times to see what you meant. This will not improve his mood one bit. Because you do not set your ideas apart, the effectiveness of your presentation will be greatly reduced. Indeed, an otherwise good report may receive a significantly lower mark because of an absence of paragraphs. Take the time to organize the thoughts you present and put them into distinct paragraphs. It pays!

It should be obvious that each paragraph should be structured in the ways you have already learned in your English classes. A topic sentence should be present in each paragraph to establish the subject of the sentences in that paragraph. The topic sentence generally appears at the beginning of the paragraph. It may appear at the end as well, in the form of a clinching sentence which sums up the ideas and details listed above it and leaving the reader with a strong impression of the conclusions you have drawn about the facts. Also, in no circumstances should sentences and details be included in the paragraph which do not develop the idea presented by the topic sentence. Such off-topic sentences and details are irrelevant and have no place there. If you have new ideas, it is time to start a new paragraph.

THE INTERIOR PAGES: TITLES & SUB-TITLES

The title of the report which appears on the title page should also appear on the first line inside the upper margin of the first page of the report. It should be properly capitalized according to the appropriate grammatical rules: the first word, all nouns, verbs, adjectives, adverbs, pronouns, and any other words of five letters or more must begin with capital letters; all other words are spelled fully in small letters.

No title should be underlined in a formal report.

Main titles in typed reports can be capitalized throughout; handwritten titles are a combination of capitals and small letters.

A space should be left below the main title on the first page.

The main title should be centered on the first line inside the upper margin of the first page.

Some reports may also have sub-titles denoting sections dealing with a specific aspect of the main topic. Sub-titles may be acceptable to some teachers, but not to others. Check with the teacher assigning the report before using sub-titles.

All sub-titles follow the same rules as given previously for main titles, except:

(1) Sub-titles begin at the edge of the left-side margin.

(2) Sub-titles begin anywhere in the page. A line must be left blank above it to separate it from the previous paragraph. A line must be left below it before you start the first line of the beginning paragraph in the section.

LESSON 12 - ORGANIZATION OF THE REPORT

The way your final report is organized should follow a definite pattern:

(1) Title Page
(2) Body of the Report
(3) Footnotes & Appendices
(4) Bibliography

It is doubtful that you will have any footnotes or appendices in your report (these will be discussed later), but you will have to have a title page, the actual report, and a bibliography.

The body of the report should be a minimum of five paragraphs in length. The first paragraph is an introduction to the topic you have chosen. In it you state the nature of the narrowed topic you are dealing with, perhaps giving the question or argument which you will answer or prove in the following paragraphs. Each of the following paragraphs is a developmental paragraph which discusses some aspect of the topic and includes all ideas and facts related to that part of your discussion. There should be at least three developmental paragraphs, and likely more. Finally, there must be a concluding paragraph which "wraps up" the whole report by leaving the reader with a final impression of what you have accomplished.

BIBLIOGRAPHY

The bibliography is one of the most important sections in your report. The purpose of the bibliography is to give the reader the information he requires to find any source book or periodical article you used as a reference for your report. Many experienced readers will often turn to the bibliography before reading a report. They are interested in the nature and probable value of your references; and if the bibliography is very short or contains highly questionable source materials, a poor impression will be formed of your report as a research paper. Remember: the bibliography is an instant record of the research you did. If you did not appear to make a solid attempt to find the best information available, your research efforts themselves can be judged as a failure.

The form that the bibliography takes is very important as well. You MUST follow the standard format to avoid any mistakes about the required information, or a reader might not be able to look up the reference for himself if the need arises.

The following procedures are strongly recommended:

1. PREPARE BIBLIOGRAPHY CARDS: You have already been instructed to make your note cards so that the first card for any reference work contains much the same information as does an author card from the Library card catalogue. These cards should take the following form:

Book Card

Davis, John P. The Saint Bernard. New York: Doubleday, 1978.

Periodical Publication Card

Lyon, Robert. "Saint Bernards to the Rescue." Dog Lovers Monthly. vol.17, August, 1958.

2. FOLLOW CORRECT BIBLIOGRAPHY FORMAT: A bibliography is an alphabetical list by authors, with the last name first.

   Do not number each entry.

   If an author is listed more than once, because you consulted several of his books and articles, you do not have to repeat his name each time. Rather, you organize his works alphabetically by title, preceded by a long dash which represents his name every time after his first work.

   If there is no author (a common occurance in encyclopedias, etc.) use the first word of the title of the article as the word on which the alphabetical order is determined.

Each entry will take the following order of information:

Books:

1. Author, with last name first.
2. Title, underlined.
3. Place of Publication.
4. Publishing Company.
5. Year of publication.

Encyclopedias:

1. Title of article, in quotation marks.
2. Name of the encyclopedia
3. Volume number of encyclopedia in which the article appears.
4. Year of publication.

Periodical Articles:

1. Author, with the last name first.
2. Title of article, in quotation marks.
3. Name of magazine/newspaper/etc., underlined.
4. Volume number of periodical (if given)
5. Date (month, year) of publication. If a newspaper, give the day, month, and year of publication.

Short bibliographies will list all of these together. Long bibliographies tend to separate books from encyclopedias and periodicals. Books come first under their own heading, then periodicals under that heading, and finally encyclopedias under the heading of "General References" or "Encyclopedias."

The following page is an example of how a short bibliography might appear on the page. Remember, only the references are given on the bibliography page.

BIBLIOGRAPHY

Aardvark, Allan A. My Life with the Saint Bernards. Berne: Sweitzer & Braun. 1961.

Burton, Mark. The Dog Handlers Handbook. London: Metheun. 1972.

Davis, John P. "A Gentle Breed: Saint Bernards as Family Pets." Dog Daze Magazine. November, 1974.

_____. The Saint Bernard. New York: Doubleday. 1978.

Lyon, Robert. "Saint Bernards to the Rescue." Dog Lovers Monthly. Vol. XVII, August, 1958

"Saint Bernards." The Dog Encyclopedia. Vol. 4, 1978

"Shoot Killer Dog Screams Outraged Mother." Ponduck Prairie Daily. July 27, 1977.

SAMPLE
READING BIBLIOGRAPHY
FOR LA-SOCIAL INTEGRATION

CALL NO.	BOOK
F B	Baubary, James. The Fort in the Wilderness.
F CLA	Clark, Joan. The Land of Robin Squires.
PB	Craig, John. No Word for Good-bye.
F C	Cutt, W.T. On the Trail of Long Tom.
F D	Dwight, Allan. Drums in the Forest.
PB	Faulkner, Cliff. The Smoke House.
F F	Faulkner, Cliff. The White Calf.
PB	Freedman, Benedict. Mrs. Mike.
PB	Freeman, Bill. The Last Voyage of the Scotian.
PB	George, Jean. Julie of the Wolves.
PB	Haig-Brown, Roderick. The Whale People.
PB	Harris, Christie. Ravens' Cry.
PB	Harris, Christie. Secret in the Stlalakum Wild.
F H	Harris, Christie. West with the White Chiefs.
F H	Hayes, John F. A Land Divided.
F H	Hinds, Margery. Makpa: The Story of an Eskimo-Canadian Boy.
F H	Houston, James. Wolf Run: A Caribou Eskimo Tale.
PB	Kelly, Thomas. Rat River Trapper.
F L	Langford, Cameron. The Winter of the Fisher.
F L	Lawrence, R.D. Cry Wild: The Story of a Canadian Timber Wolf.
F L	London, Jack. The Call of the Wild

PB Mowat, Farley. The Curse of the Viking Grave.

PB Mowat, Farley. Lost in the Barrens.

F Mowat, Farley. Never Cry Wolf.
M

F O'Brien, Jack. The Return of Silver Chief.
O

F O'Brien, Jack. Silver Chief's Revenge.
O

F O'Brien, Jack. Silver Chief to the Rescue.
O

F Yates, Elizabeth. With Pipe, Paddle, and Song: A Story of the
Y French Canadian Voyageurs, circa 1750.

921 Boulanger, Tom. An Indian Remembers.
BO

921 Petrie, A. Joseph Brant.
BRA

921 Bredin, Thomas. From Sea to Sea: Alexander Mackenzie.
MA

921 Syme, Ronald. Alexander Mackenzie.
MA

921 Wood, Kerry. The Great Chief Moskepetoon: Warrior of the Crees.
MA

921 Allan, J. Wop May.
MA

378.2 Harris, Christie. Mouse Woman and the Mischief Makers.
HAR

398.2 Harris, Christie. Once More upon a Totem.
HAR

WHEAT FARMING IN WESTERN CANADA

Developed By
Marilyn Webber

An Interdisciplinary Unit in Social Studies, Science and Language Arts.

STUDENT HANDBOOK - GRADE 7

Table of Contents

1.
2. Alberta Wheat Pool
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4.
5. Wheat Production
6. Wheat Production Chart
7. Vocabulary
8. Chronology of Canadian Agriculture
9. What Farm Machine Am I ?
10. Wheat to Flour
11. 1885 Street
12. From Wheat to Flour
13. Students' Story of Wheat

STUDENT MATERIALS

The following materials are not included but can be obtained.

1. Trails Grown Over - 20 page booklet available from the Alberta Wheat Pool.

2. The Operation of a Grain Elevator - colored pamphlet showing the operation of an elevator from the Alberta Wheat Pool

3. The Producer and The Job Maker
4. Bushels of Grain per Tonne

} two charts to be used as handouts from Alberta Wheat pool

5. Wheat Production

   Answer the following questions by carefully reading the chart on the next page.

   (a) What country produced the most wheat in 1959?
   (b) What country in North America produced the most wheat in 1959?
   (c) What two continents produced the same amount of wheat in 1959.
   (d) What would account for the drop in productive acres (of wheat) from 1959 to 1960?
   (e) Why do you think there are no statistics given for China's production of wheat in 1959?
   (f) There is a slight increase in wheat production for South America and Africa in 1959. Why do you think this happened?
   (g) How many bushels of wheat did Canada have in 1959?
   (h) How many bushels of wheat did the U.S. have in 1959?
   (i) How many acres did India have for wheat in 1959?

6. Vocabulary

A. BOOKLET: From Wheat to Flour
Wheat Flour Institute

spikes
beard
rachis
husk
einkorn
Fertile Crescent
hybrid
self-pollinating
enriched flour
winter wheat
spring wheat
shorts
bran
malt
linseed
linen
canola

B. STUDENTS' STORY OF WHEAT

commodity
primary industry
secondary industry
cereal
leavening
chapati
bulgur
maize
sorghum
millet
scone
steam bread
Rycena
Wurld
2-4-D
pasta
quota
jute
triticale
trace elements
staple

6. Wheat Production Chart

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WORLD WHEAT ACREAGE AND PRODUCTION[1]

Continent and Country	Acreage[2]				Production			
	Average				Average			
	1935–39	1950–54	1959	1960[3]	1935–39	1950–54	1959	1960
	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels
NORTH AMERICA								
Canada	23,595	26,130	23,065	23,198	312,399	537,632	413,520	489 [illegible]
Mexico	1,244	1,647	2,338	1,853	14,284	21,788	51,440	45 [illegible]
United States	57,293	63,361	52,665	52,643	758,629	1,094,183	1,126,682	1,363 [illegible]
Estimated total[4]	84,170	91,200	78,160	77,780	1,086,000	1,654,000	1,592,000	1,900 [illegible]
EUROPE								
Austria	630	573	661	685	15,942	16,920	21,620	25 [illegible]
Belgium	394	421	496	498	15,887	20,278	29,145	28 [illegible]
Denmark	319	195	218	203	14,470	10,630	13,375	11 [illegible]
Finland	230	377	344	447	6,100	8,739	8,900	13 [illegible]
France	12,560	10,916	10,970	10,776	286,505	315,244	425,000	400 [illegible]
Germany, West	2,785	2,728	3,295	3,429	92,400	110,228	165,540	181 [illegible]
Greece	2,172	2,410	2,875	2,820	30,425	40,042	65,000	61 [illegible]
Ireland	225	352	252	365	7,689	13,036	13,600	16 [illegible]
Italy	12,577	12,085	11,600	11,300	278,366	288,080	311,000	250 [illegible]
Luxembourg	47	45	——	——	1,215	1,382	——	——
Netherlands	333	209	297	313	15,217	11,376	18,140	21 [illegible]
Norway	80	56	23	22	2,391	1,682	730	67
Portugal	1,720	1,785	2,094	1,920	18,400	23,526	22,900	18 [illegible]
Spain	11,253[5]	10,470	10,774	10,378	157,986[5]	155,000	170,000	132 [illegible]
Sweden	740	896	778	836	26,351	29,640	30,725	30 [illegible]
Switzerland	183	225	256	255	6,050	9,430	12,150	12 [illegible]
United Kingdom	1,843	2,263	1,929	2,114	62,361	94,640	104,000	109 [illegible]
Estimated total, Western Europe[4]	48,100	46,020	46,940	46,410	1,038,300	1,150,000	1,415,000	1,313 [illegible]
Bulgaria	——	3,540	3,457	——	——	66,000	75,000	——
Czechoslovakia	——	1,840	1,875	——	——	52,500	56,000	——
Germany, East	——	1,120	1,075	——	——	38,100	47,800	——
Hungary	——	3,400	2,759	2,598	——	72,500	70,150	61 [illegible]
Poland	——	3,730	3,546	——	——	70,800	92,000	——
Rumania	——	6,710	7,383	——	——	108,750	147,000	——
Yugoslavia	5,400	——	5,263	5,090	97,700	80,000	151,750	131 [illegible]
Estimated total, Eastern Europe[4]	26,750	25,500	25,610	25,230	561,700	490,000	645,000	392 [illegible]
Estimated total, all Europe[4]	74,850	71,520	72,550	71,640	1,600,000	1,640,000	2,060,000	1,951 [illegible]
USSR (Europe and Asia)[4]	104,000	111,500	157,000	148,500	1,240,000	1,240,000	1,900,000	1,700 [illegible]
ASIA								
China[7]	51,896[5]	——	——	——	786,035[5]	890,000	——	——
India[8]	25,460[5]	24,456	31,141	31,508	262,100[5]	253,950	365,000	362 [illegible]
Iran	4,191[5]	——	——	——	72,128[5]	75,100	110,000	91 [illegible]
Iraq	1,724[5]	1,871	——	——	18,114[5]	22,210	24,200	[illegible]
Israel	——	90	137	130	——	1,000	2,700	[illegible]
Japan	1,735	1,766	1,486	1,489	49,954	53,322	52,000	36 [illegible]
Jordan	——	651	525	——	——	5,600	3,800	[illegible]
Korea, South	832[9]	245	310	——	10,240[9]	4,394	5,300	[illegible]
Lebanon	——	165	153	128	——	1,902	920	[illegible]
Pakistan[8]	9,305[5]	10,364	12,000	12,193	117,000[5]	129,800	144,000	[illegible]
Syria	1,363	2,277	2,100	——	19,485	26,510	14,700	[illegible]
Turkey	8,973	13,314	——	——	135,690	213,598	225,000	[illegible]
Estimated total[4]	114,190	127,800	140,760	143,880	1,558,000	1,765,000	1,900,000	[illegible]
AFRICA								
Algeria	4,185	4,267	4,302	4,600	35,201	41,508	40,600	[illegible]
Egypt	1,464	1,631	1,531	1,512	45,849	49,060	53,000	[illegible]
Morocco[10]	3,254	3,496	3,870	4,057	23,128	35,302	36,500	[illegible]
Tunisia	1,950	2,399	3,274	3,346	14,962	19,796	19,300	[illegible]
Republic of South Africa[11]	1,926	3,020	3,156	——	16,023	23,040	27,200	[illegible]
Estimated total[4]	13,830	16,480	18,170	18,760	143,000	185,000	200,000	[illegible]
SOUTH AMERICA								
Argentina	13,834	11,871	10,818	——	221,769	216,204	215,000	[illegible]
Brazil	414	1,475	——	——	4,978	18,500	13,600	[illegible]
Chile	1,963	1,910	2,185	2,110	31,562	35,764	40,600	[illegible]
Colombia	——	430	395	410	——	4,860	5,160	[illegible]
Peru	285	410	370	370	3,274	5,814	5,900	[illegible]
Uruguay	1,210	1,515	725	1,235	13,256	22,376	8,700	[illegible]
Estimated total[4]	20,490	17,840	16,870	15,260	281,000	305,000	290,000	[illegible]
OCEANIA								
Australia	13,128	10,716	12,173	12,857	169,744	181,150	199,300	[illegible]
New Zealand	211	116	161	165	7,129	4,720	8,300	[illegible]
Total	13,349	10,832	12,334	13,022	176,873	185,870	207,300	[illegible]
Estimated World Total[4]	424,500	447,170	495,840	488,840	6,085,000	6,975,000	8,150,300	[illegible]

[1] Years shown refer to years of harvest in the Northern Hemisphere. Harvests of Northern Hemisphere are combined with those of the Southern Hemisphere which immediately follow; thus, the crop harvested in the Southern Hemisphere in 1960 is combined with preliminary forecasts for the Southern Hemisphere, harvests [illegible] 1960 and early in 1961. [2] Figures refer to harvested areas as far as possible. [3] Preliminary estimates [illegible]

VOCABULARY (continued)

C. SLIDE SET: EPSB
S.S. 321 Farm Machinery

front end loader
plow
disc
harrow
drill
cultivator
sprayer
fork-lift
mower
rake
baler
swather
combine
harvester

FILMS

forage
obsolete
automation
Charolais
Hereford
supplement
mechanized silos
feeder steers

8. Chronology of CANADIAN Agriculture

In the chart below, give the approximate dates and a brief account for each's contribution to Canadian Agriculture. (P. 7-10 Students' Story of Wheat)

NAME	DATES	CONTRIBUTIONS
Samuel de Champlain		
Louis Hebert		
Lord Selkirk		
Peter Pond		
Harmon		
Rev. J. G. Brick		
Wm. Cust		
I. McFarlane		
D. Fyfe		
Dr. Chas. Saunders		

9. What farm machine am I?

_____ I cut, lift and turn the soil over for a seedbed.

_____ I have round steel blades that are used to cut through the soil.

_____ I am an implement set with spikes or spring teeth used for pulverizing and smoothing the soil.

_____ I am used in planting the seeds. I make furrows, drop the seed, and then cover them.

_____ I loosen the soil and kill the weeds for summerfallow.

_____ I carry chemicals that are spread over the plants to kill weeds.

_____ I am used to cut hay. I leave the hay in rows so they can dry.

_____ I am a machine used to gather or bunch the hay.

_____ I bind up the hay with twine into large bundles for stacking.

_____ I am a harvest machine that cuts, threshes and cleans the grain while I move across the field.

_____ I cut the grain about 10 inches from the ground and leave it in rows until it ripens and dries.

_____ I am a curved blade that primitive farmers use to cut their crops.

10. Wheat to Flour Review Questions

How long has wheat existed as a food crop?
Why does popcorn "pop"?
What special property does wheat have that other grains do not?

What characteristics are considered in the production of new wheat varieties?
Why was einkorn undesirable as a crop?
What are the two main kinds of wheat?
What kinds of wheat are used for bread flour?
What kinds of wheat are used for cookies and pastries?
What are the three main parts of the wheat kernel?

What are the general north and south latitudes that allow for wheat farming?

What is the average rainfall needed for wheat farming?

Explain the following statements: Paragraph Assignments or Discussion Topics

The first word in war is always spoken by guns - but the last word has always been spoken by bread.

Wheat cultivation is responsible for man's growth of cities.

Use of this cereal (wheat) dates back as far as 75,000 years ago and there is historical evidence of its cultivation for 70 centuries.
(P. 2 Students' Story of Wheat)

Bread has been described as "the staff of life".

11. 1885 Street

The Administration Office at Fort Edmonton will hand out the following manual free of charge. (1885 Street - Activity Programme - Manual) (see pp.215-219)

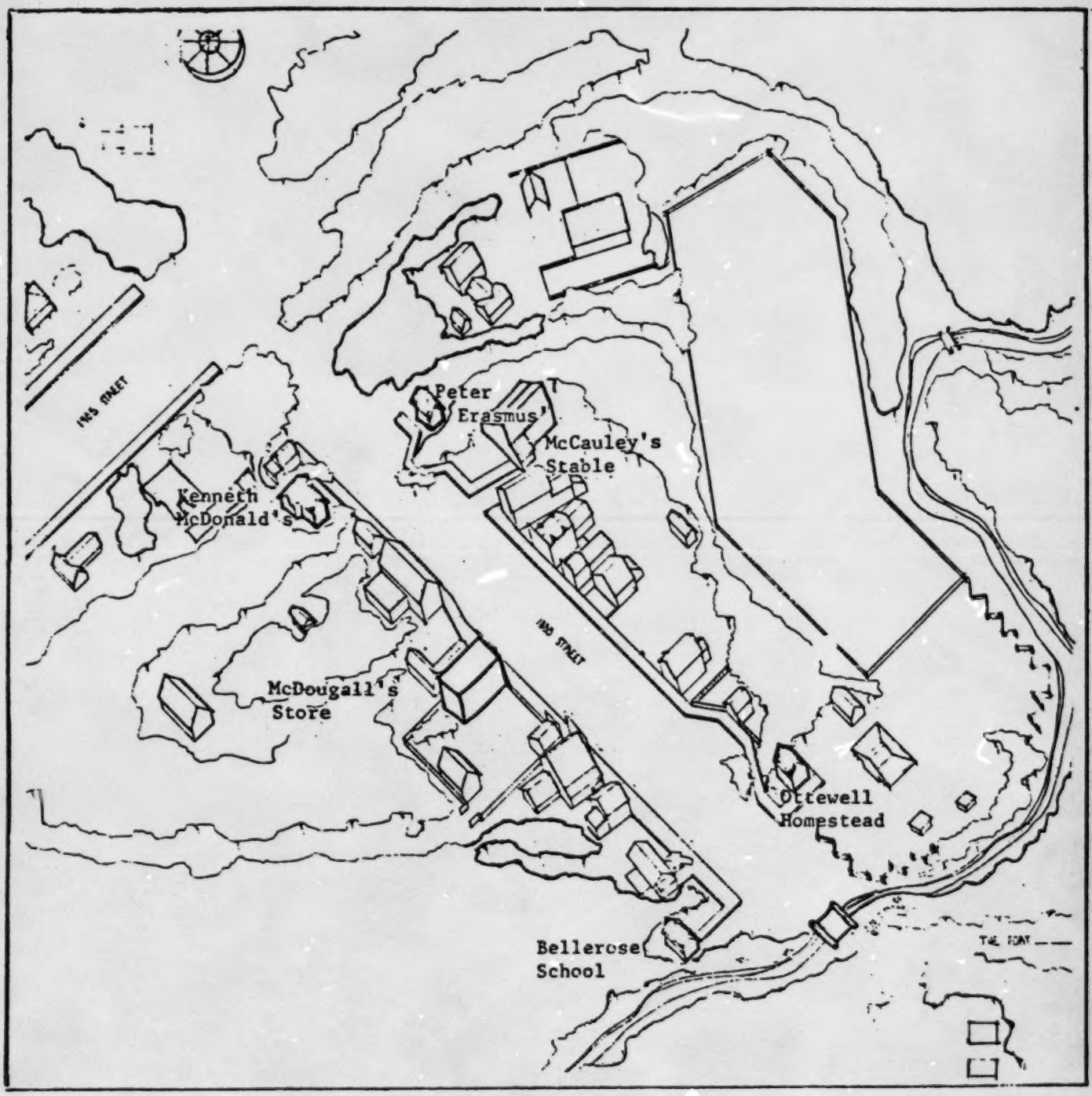
12. Teachers can write for the booklet "From Wheat to Flour"
address: Wheat Flour Institute, Chicago, Illinois, U.S.A. 60606
This company will send you class sets of these booklets. There may be a newer edition. I used the 1965 edition.

13. The second booklet entitled "Students' Story of Wheat" is available free of charge to anyone from the Public Relations Dept. of Alberta Wheat Pool, Box 2700, Calgary, Alberta, T2P 2P5.

1885 STREET

ACTIVITY PROGRAMME

MANUAL


Peter
Erasmus'
McCauley's
Stable
Kenneth
McDonald's
McDougall's
Store
Ottewell
Homestead
Bellerose
School

OTTEWELL HOMESTEAD

This is a reconstruction of the house built in 1884 by Richard Phillip Ottewell on his homestead in the Clover Bar area.

Ottewell was born in England in 1848 and came to Canada in 1869. He worked throughout the northwest and arrived in Edmonton in 1881. The first home on the homestead was a small sod-roofed dugout. In the spring of 1882, Ottewell began to clear and break land and by fall he harvested a small crop of barley and wheat. After the harvest of 1883 he went back east to get his family.

Mr. and Mrs. Ottewell raised 6 boys and 3 girls in this house until the early 1900's when they built a large brick house.

BAKING/COOKING

Preparing food was a very important task in every pioneer household, and children were taught early in life how to cook.

In this activity, students will get a chance to practice their cooking and baking skills by making bannock and molasses candy on a wood-burning cookstove.

BANNOCK

12 cups flour
4 tsp. salt
4 tbsp. sugar
8 heaping tsp. baking powder
2 cups drippings or lard
8 cups cold water

Mix into a ball of dough. Knead well for 5 to 8 minutes. Roll into large round cakes about 1" thick. Cook until light brown.

MOLASSES CANDY

6 cups molasses
2 1/3 cups sugar
1 1/6 tbsp. vinegar
2 1/3 tbsp. butter
1 tsp. soda

Place molasses and sugar together in saucepan; stir occassionally while boiling. Before taking from the fire, add butter and soda. Pour into buttered tins, and when cool, pull it until well whitened.

GROUP #1	GROUP #2	GROUP #3	GROUP #4	GROUP #5	GROUP #6
BELLEROSE		KENNETH McDONALD'S	McCAULEY'S	ERASMUS	OTTEWELL
		McCAULEY'S	KENNETH McDONALD'S		
ERASMUS	OTTEWELL	BELLEROSE		KENNETH McDONALD'S	McCAULEY'S
				McCAULEY'S	KENNETH McDONALD'S
KENNETH McDONALD'S	McCAULEY'S	ERASMUS	OTTEWELL	BELLEROSE	
McCAULEY'S	KENNETH McDONALD'S				

ACTIVITIES

Bellerose School - Lesson Plan
Kenneth McDonald's - Leather Tooling
McCauley's Livery Stable - Harness Oiling
Erasmus and Ottewell - Baking and Cooking

The Programme will run for 2 hours (9:30 - 11:30 a.m. or 1:00 - 3:00 p.m.).

The students will spend approximately 35 minutes at Bellerose School, and at either Erasmus or Ottewell; and approximately 15 minutes at McCauley's and at Kenneth McDonald's.

Please have your class divided into 6 groups, with each student wearing a color- or number-coded name tag.

As some of the activities tend to get slightly "messy", please have your students dress appropriately.

Washroom facilities are located in the rear of McDougall's Store.

PETER ERASMUS' HOUSE

This is the original house in which Peter Erasmus and his family lived for 4 years. It was situated 2½ miles west on the Victoria Trail from Pakan.

Peter Erasmus was born in 1833 of a Danish father and a mother of Ojibway mixed blood. At the age of 19 he started training for the ministry, but left after 3 years to take a position as guide and interpreter for the Rev. Thomas Woolsey. In 1858 he accepted a similar job with the Palliser expedition and he also acted as an interpreter for signing of Treaty #6 (1876 - 1878). Erasmus moved to Gleichen in 1900 where he was employed by the government as a clerk and an interpreter.

Peter Erasmus was married twice and had 5 girls and 4 boys.

KENNETH McDONALD'S HOUSE

This is Kenneth McDonald's original second home, which was constructed in 1886 & stood at 9173 Jasper Avenue.

McDonald was born in Scotland in 1828 and came to Canada when when he entered the H.B.C. Service in 1847. He worked first at Fort Pitt where he met and married Emma Rowland. In 1860, McDonald and his family (5 daughters and 2 sons) were transferred to Fort Edmonton where he served mainly as a harness maker. Upon leaving the H.B.C. in 1871, he staked a claim on what later became River Lot #20 and thus became the first settler living outside the pallisade walls.

McDonald was engaged in mixed farming and was one of the group of men who established Edmonton's first school and guaranteed the salary of the first teacher in 1881.

BELLEROSE SCHOOL

This is the original building constructed in 1886 on the homestead of Octave Bellerose on the road north of the Sturgeon River which connected St. Albert and Namao.

The students who travelled to school from great distances (usually on horseback), were mostly Roman Catholic French-speaking children. While English was taught as a subject, is is likely that instruction was in French and limited itself to the "3 R's".

The first teacher at Bellerose was Mr. Alfred Arcand. Classes were held in his home for the first year (1885) before the school was built. The building was last used as a school around 1900.

McCAULEY'S LIVERY STABLE

This is a reconstruction of Matthew McCauley's livery stable, as it appeared in 1886. It was originally located on land purchased from the Methodist Church on the property where McCauley Plaza is situated today.

Matthew "Matt" McCauley was born and raised in Ontario, and came to Edmonton in 1881. He operated his livery business on his own from 1882 to 1889, when he sold half interest to W.G. Ibbotson. The business eventually grew into the Edmonton Cartage Company, and in 1902, McCauley sold out.

McCauley was elected the first Mayor of Edmonton, and served for 3 years from 1892 to 1895. He was also involved in most of the major social and business organizations in the town.

Matt McCauley married Matilda Benson in 1875 and they had 8 children. His first wife died in 1896, and in 1906 he married Annie Cookson, with whom he had 4 more children.

HARNESS OILING

Horses played an important part in the lives of the pioneers. They were the primary means of transportation (being ridden, or used to pull buggies) and they were almost indispensable for farm work.

In order for the horses to be driven, they had to be outfitted with bridles, saddles, harnesses, etc. These items were all hand-crafted from leather, and in many cases, parts of the harnesses were "custom-made" to fit particular horses.

To keep the leather supple, it had to be regularly cleaned and oiled. In this activity, the students will work on this harness maintenance.

Each student will take a rag with a bit of neatsfoot oil on it, and carefully rub the oil into the leather. The object is to work on a small section at a time, rubbing with good pressure, to ensure that the oil soaks in.

LEATHER TOOLING

The pioneers used leather in making a variety of things from clothing to saddles and harnesses to footwear. In this activity the students will get a chance to work with leather, by making their own individual bookmarks.

The first step in leather tooling is to soak the working surface of the leather strips with water. Then, making sure that their strips are placed on the pounding boards, the students can select the stamps they wish to use and with a wooden mallet, impress the designs in the leather. To give the bookmarks more color, they can later be dyed or oiled.

BELLEROSE SCHOOL

This part of the programme will let the children experience school life in the 1880's. While we will list a sample of what could be done in this thirty-five minute period, you may change activities or choose different activities for your class if you wish.

It would be most beneficial if the teacher did some pre-visitation work for this activity. A classroom discussion supplemented with pictures or stories would help the children to better understand their roles. The children could also dress in period clothing (long skirts for girls, hats and vests for boys) to further help them appreciate their roles.

SAMPLE ACTIVITIES

3 - 5 minutes. The children wait outside the school until the teacher rings the bell. (This bell is located on the teacher's desk). They enter the classroom, hang their coats on the pegs and sit at a desk.

The teacher will call the class to order and begin by having the children salute the flag.

"I SALUTE THE FLAG,
THE EMBLEM OF MY COUNTRY,
AND TO HER I PLEDGE,
MY LOVE AND LOYALTY"

The teacher will call the roll.

5 - 7 minutes. Arithmetic Lesson. The children will take out a slate, chalk and cloth.

One at a time, the teacher will place the following addition problems on the board.

			326	
36	528	614	+714	4879
+43	+721	+193	+468	+3261

10 - 12 minutes. Penmanship. The students will take out pen & ink. A class member will pass out paper. The teacher will write the following sentences on the board. The children will copy them, in their best writing, onto their papers.

1. The date today is October ___, 1885.
2. My name is _____.
3. I live in the town of Edmonton, Northwest Territories, Canada.
4. Our Queen's name is Victoria.
5. I go to Bellrose School and my teacher's name is _____.

A student will collect the papers and the children will put away pens and ink.

They will then get ready to go outside. The teacher will take them to the field behind the school where they will play a game of "Flying Duchman" until it is time to move to the next area. (Remember to leave five minutes travelling time).

FLYING DUTCHMAN

A large circle is formed with all but one of the children holding hands. The extra child runs around the circle and taps the hands of two children standing side by side. The children who are tapped run in opposite directions around the circle trying to get back to the space they left. Because the person who originally tapped them has taken one space, the first back takes the other space leaving one person without a space. The game continues like this.

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CONFIRMATION OF RESERVATION

☒ FORT EDMONTON PARK ☐ JOHN WALTER MUSEUM ☐ TOUR ☒ PIONEER ACTIVITY PROGRAMME ☐ OTHER

DATE OF VISIT October 15, 1980 TIME 9:30 a.m. NUMBER IN GROUP 50-60

GROUP LEADER Mrs. Webber SCHOOL Edith Rogers Jr. High GRADE 7

TELEPHONE No. 462 - 3310 ADDRESS 8308 - Millbourne Rd. POSTAL CODE

*Plus cost of supplies : See Activity Manual

CHARGES [redacted] ADDITIONAL $1.00/child EACH
less 25%

INSERVICE FOR PIONEER ACTIVITY PROGRAMME

DATE Oct. 8/80 TIME 7:00 p.m. LOCATION JHH - FEP COST 50¢/person DATE BOOKED

WHITE COPY – TEACHER PINK COPY – CASHIER BUFF COPY – FILE PLEASE SEE REVERSE

1885 STREET PIONEER ACTIVITY PROGRAMME

SUPPLY LIST

BAKING/COOKING (for 60)

BANNOCK

12 cups flour
4 tsp. salt
4 tbsp. sugar
8 tsp. baking powder
2 cups drippings or lard
grease for frying pans
4 cups water

MOLASSES CANDY

6 cups molasses
1 1/3 cups sugar
1 1/6 tbsp. vinegar
2 1/3 tbsp. butter
1 tsp. baking soda
butter to grease pans
6 aluminum pie plates (for cooling candy)

One half of the students will be doing the baking/cooking in Ottewell, and the other half will do the same in Erasmus, so it would be wise to have the ingredients for the Bannock and the Molasses Candy divided in half, and ready to go into each of the two houses.

LEATHER TOOLING

We will provide leather strips at a cost of 30¢ each, for each student to make one bookmark.

HARNESS OILING

Rags

WHO AM I

Developed By
Cam Eddy

An Interdisciplinary Unit in Social Studies and Language Arts.

STUDENT HANDBOOK - GRADE 7

Table of Contents

1. Life Line Project
2. Poster Project
3. Charactoons
4. Personal Essay
5. The Family Tree
6. Map Work

WHO AM I

STUDENT HANDBOOK

Activity #1 Life Line Project - The Introduction

1. Bring to class the following material
   (a) a piece of string - the length of your arm
   (b) a picture of yourself, one that can be cut
   (c) a picture of someone that represents how you would like to look when you get older. Source of picture: magazines or catalogues.

2. List and chart 5 happy and 5 sad events using the following chart as a guide.

   First pet Dec. 1972 fish

	Event	Date	Symbol
1.	Born	Mar. 6 1960	*
2.	Baby brother	Feb. 20 1962	
3.	First pet	Feb. 17 1963	
4.	Broke left arm	Aug. 20 1965	

3. Draw the ten symbols on small tags and attach them to the string, called your life line. Use approximately 1/3 of the string for this. On the bottom 2/3 make up tags that represent your goals and dream of the future.

4. Paste a picture from a magazine that represents what you would like to look like in the future onto a sheet of construction paper.

5. Attach your life line to this sheet of construction paper.

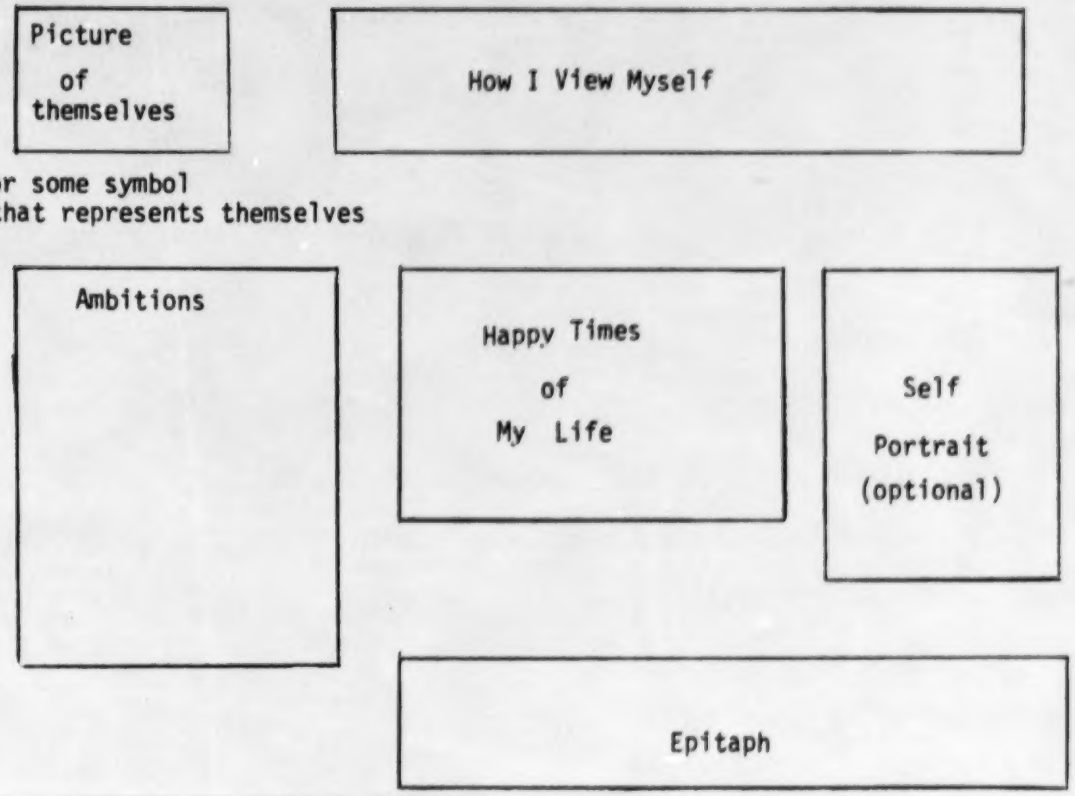
6. Prepare an oral presentation that explains your life history using your life line as visual material. Be prepared to answer any questions your group may have for you.

Activity #2 Poster Project

Create a poster using the following headings as a guide.

1) How I View Myself
2) My Hobbies
3) Happy Times of My Life
4) Ambitions
5) Epitaph

An example layout of your poster could be as follows:



Activity #3 Charactoon

1. Charactoon - In the centre of the page
   - depict your character through a cartoon figure (come as close as you are able, freckles, braces, etc.)

2. Details - Use creativity in depicting the details (small collages, musical notes, sketches).

   (a) Hobbies
   (b) Favorite Foods
   (c) Favorite sayings
   (d) Best Buddy (cartoon him/her)
   (e) Favorite Music Group (or song hit)
   (f) Bad Habit (chewed fingernail)
   (g) Strong Dislike(s)
   (h) Talent
   (i) Favorite Famous Person (an Idol)

   - Print a heading on your poster and then the detail in some creative manner, as suggested on the following page.

SKI
Bus
TOURS
SKI
INSTRUCTOR
SPORTS
SPORTS
SPORTS
SPORTS
SPORTS

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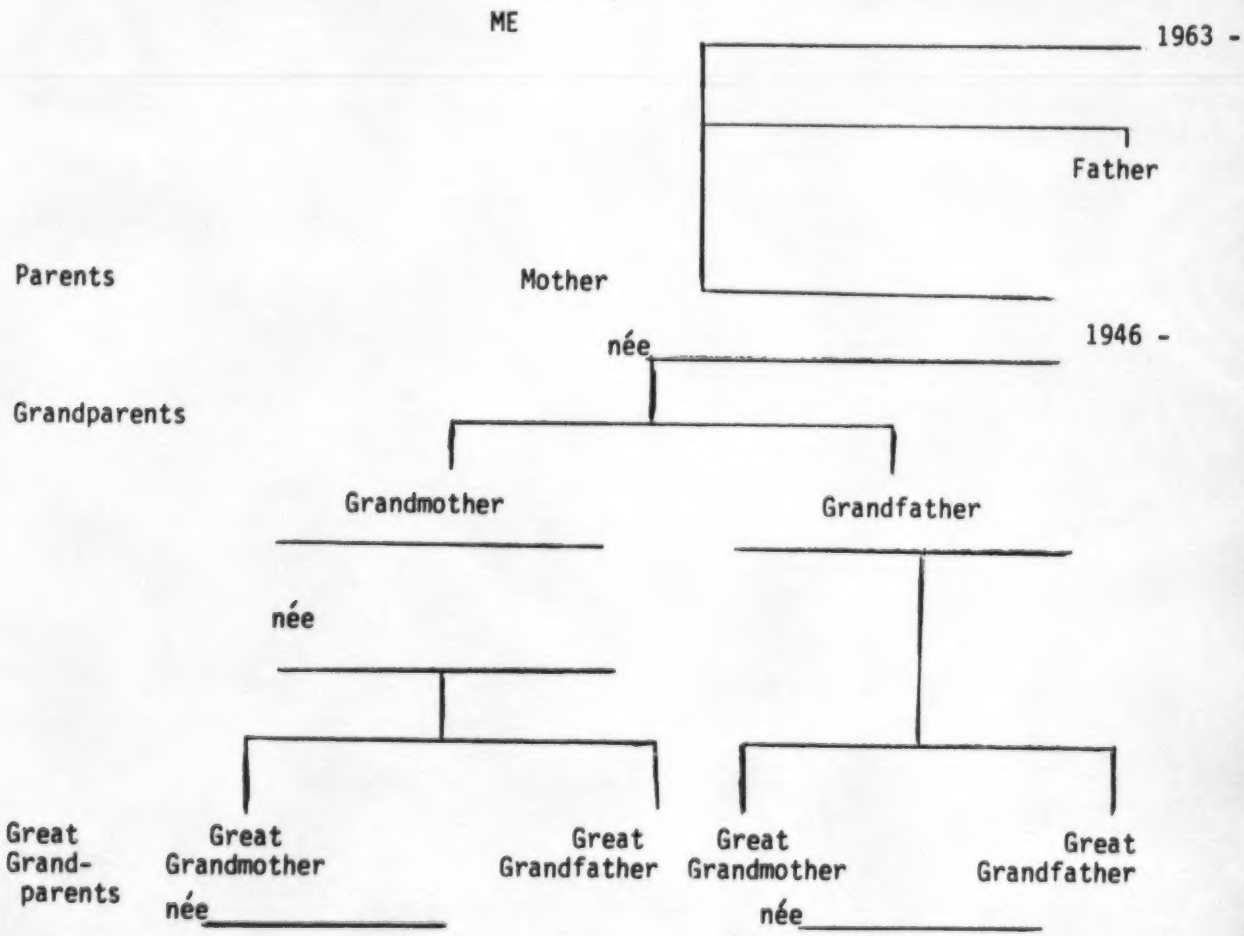
Activity #4 Personal Essay

Write a personal essay using the following procedure
1) Write a paragraph that introduces yourself.
2) Write a paragraph on each section of your poster. Organize these paragraphs into a logical sequence.
3) Write a concluding paragraph for these paragraphs.

Activity #5 The Family Tree

Using the following chart, trace your Mother's side of your family tree. You may also do your father's side.

* Do not include Brothers and Sisters
* Follow your direct line - if a parent or grandparent remarries, put down the person who caused you to come into being
* Those names that can not be traced leave blank



Activity #6 Map Work

Using an Atlas trace the necessary map and do the following:

1) Plot the routes your grandparents traced while travelling to North America.
2) Plot the routes your parents may have travelled before you were born.
3) Plot the routes your family has traced after you were born.
4) Plot the location of the holidays your family has taken since you were born.